

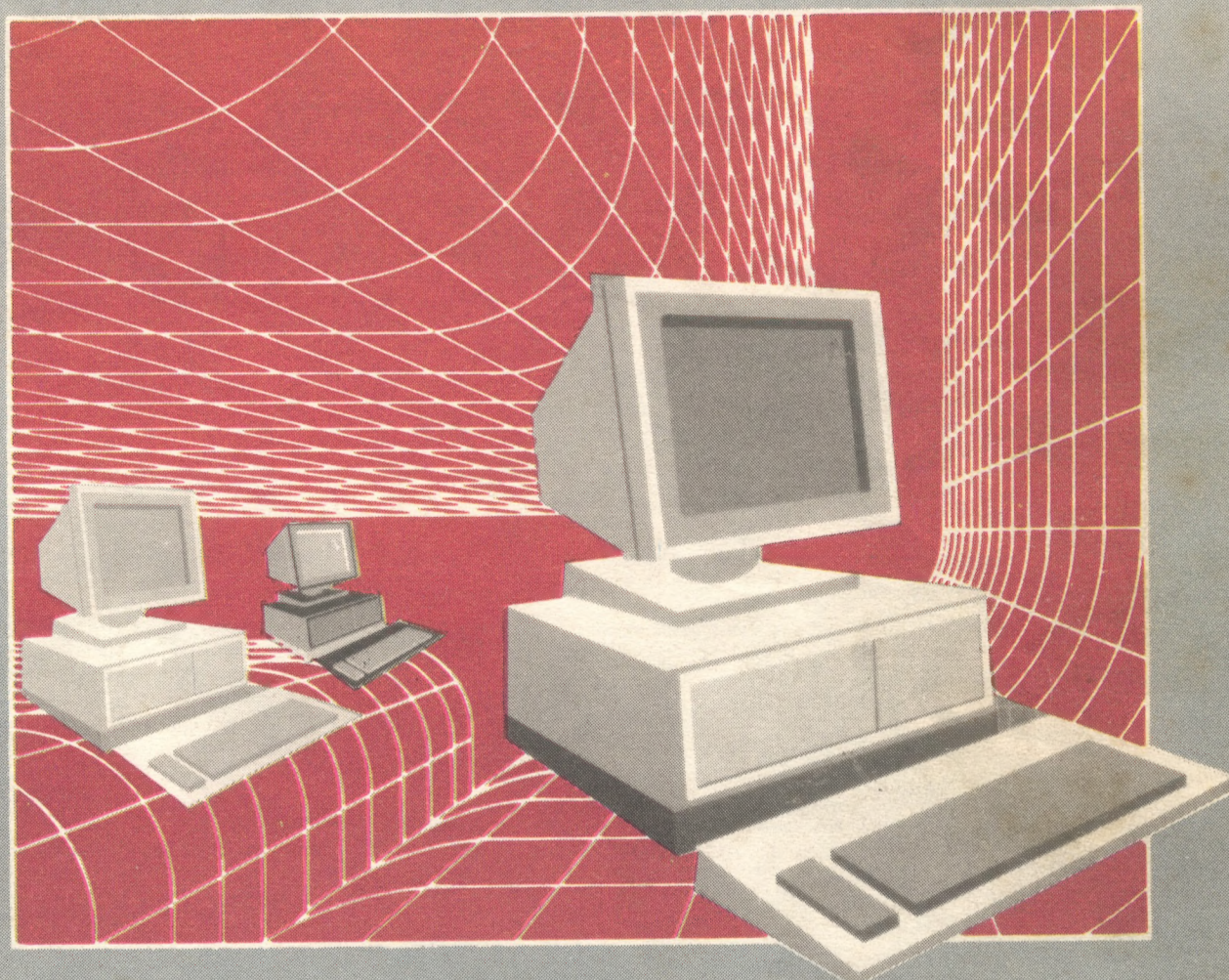
COMPUTER SHOPPER™

MONEY SAVING ADS & ARTICLES

Curing PC Clone Confusion

In This Issue...

- Laymans Guide To AI
- New Atari 1040 ST
- CES Roundup
- Understanding The TI PC



BEST PRICES - BEST PRODUCTS - BEST SERVICE
MidWest Micro-Peripherals
1-800-423-8215
10 FULL PAGES OF SAVINGS

IBM XT? **\$749.**
 See Ad Index
 American Semiconductor
 1-800-237-5758

TAPE BACKUP 20MB **\$558**
 IRWIN 1/2 HT Internal System w/Tape!
PROTO PC INC. 612-644-4660
 See Ad Index
 DEALER PRICE

America's Mailorder Headquarters
Lycos Computer
 World's Leader in Sales and Service
 See Pages 16 & 17

256K D-RAM **\$2.57**
 Qty one 1/20/86
 High Quality 150ns Parts
 Microprocessors Unlimited, Inc.
 (918) 267-4961
 See Ad Index

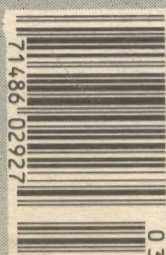
39¢ Diskettes
 See ad index for full page ad
 Communications Electronics Inc. 800-USA-DISK

Premium Quality! 100% Error Free! Lifetime Warranty!
DISKS For Apple SS/DD-40tk DS/DD
 from 33¢ from 46¢ from 54¢
 UNITECH (800)343-0472 IN MASS (617) "UNI-TECH" see ad index

Don't Risk The Unknown
 Brand Name Diskettes at the Lowest Prices!
 Disk World! See Ad Index!

THE WORLD'S LARGEST COMPUTER MAIL ORDER FIRM
CONROY-LA POINTE
 Formerly Computer Exchange
 See Ad Index

PRINTERS *Plus*
1-800-562-2727
 SEE AD FOR BEST PRICES ON EPSON



ATARI

Applying The Atari

by Jeff Brenner

Puzzle Generator, Digitized Picture

This month's feature program is *PixMix*, a high-resolution puzzle generator. Not only is this an excellent way to show off your Atari's graphics capabilities, but it's real entertaining and challenging as well. And to test it out, we'll type in data for a digitized picture.

The 520ST

Apparently Jack Tramiel has the right touch. Atari says that by the end of 1985 it had shipped about 100,000 ST units, though many of these were to Europe. And Atari has had continued success with the 800XL and the newer 130XE. Many distributors have been selling the 130XE in a package with the 1050 disk drive, 1027 letter-quality printer and *AtariWriter Plus* for an incredible \$400. Indeed, 1986 looks like a very promising year for the new Atari.

Incidentally, our editor, Stan Veit, has told me that *Computer Shopper* plans to cover the 520ST in a separate column. Therefore, my "Applying The Atari" column will remain devoted to the Atari 400/800/XL/XE.

It's Never Too Late For Corrections

Those of you using the February 1985 *Computer Assisted Study* program may still have problems saving and loading question and answer data, depending on what was residing in memory before *Computer Assisted Study* was run. To fix this for good, we can simply force the string memory to clear with the following line:

```
105 AS(1) = CHR$(0):
AS(FM) = CHR$(0):
AS(2) = AS
```

PixMix

Recently, I attended an Atari users group meeting in New York where several members displayed digitized images that they had captured with their Atari computers. A digitized image, for those of you unfamiliar with the term, is created when a signal from a video camera or videotape recorder is converted into numeric data that the computer can store. The computer

can then regenerate the video image to the limits of its graphics resolution. A slow-scan device, such as Dital Visions' "ComputerEyes," is used to convert the video signal into the data that the computer can understand.

The idea of storing realistic images in my Atari was particularly exciting to me, and I set out to design a few routines for processing and modifying captured digital images. One of these routines enabled a block of the screen to be moved to another section of the screen. On one digitized image, I had plenty of on-screen fun rearranging a young woman's eyes and nose. In a few minutes the entire image was hopelessly scrambled and the idea for the *PixMix Puzzle Machine* instantly evolved.

PixMix turns any Graphics 8 format screen (Graphics 9 through 11, or Graphics 15 or "7.5", i.e. MicroPainter screens) into a 30-piece puzzle that you can mix up as much or as little as you like. Use the joystick to move the "pieces" around the screen to reconstruct the original image. Press the space bar when you get stuck and you'll see the completed puzzle for as long as you like. When you think that you've solved the puzzle, hit the START key and hope that you'll get the short, congratulatory tune instead of the low buzz that tells you to look more carefully.

The faster you complete the puzzle, the better your time and the higher your score. *PixMix* is a great solitary game, but since a score is given, as many people as you like can compete against each other.

PixMix is listed under the "PixMix Puzzle Machine" heading and will run on any 8-bit Atari with a minimum of 40K RAM.

Sample Digitized Picture

Before you test out *PixMix*, you might want to type in and run the "Digitized Picture Data" program. This program creates a cassette or diskette file of a digitized picture of a watch. Since a full-resolution digitized Graphics 8 image is about 8K in data alone, we had to halve its vertical resolution so that it could be typed into the computer in a feasible amount of time. The image

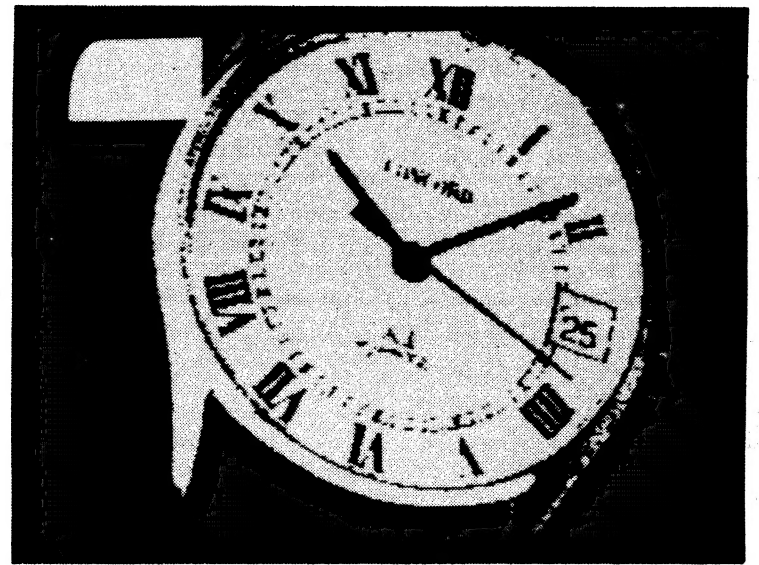
still looks realistic, though, and takes up the full length of the screen.

Using PixMix

When you RUN *PixMix*, the animated title screen will fall into place and the Atari will take a few seconds to set up the data and to load the machine language routines.

You'll be asked if you're using a cassette or diskette (press C or D). If you're using a diskette you'll be asked to enter the file name for the picture you want to load. To load the digitized watch file created with the "Digitized Picture Data" program, type "CLOCK.PIC" and press RETURN. If you want to load a picture from a diskette with several files on it, you can press RETURN to the "LOAD WHAT PICTURE FILE?" You'll then be shown each file on the diskette. To see the next file, press RETURN. To load the file that is displayed, press Y.

The screen will remain blank until the picture is fully loaded. The picture will then



Digitized Picture of Watch

appear on the screen along with a flashing cursor. Photo 1 shows how the full-resolution watch picture looks like when it is loaded into *PixMix*. The light box in the upper left-hand corner of the screen is the cursor. Plug in a joystick and you can move the cursor to any part of the screen. The cursor was designed to be visible yet semi-transparent to the screen underneath, regardless of

whether you are using a color or a black and white screen.

By pressing the trigger, you can "pick up" any piece of the picture and move it to wherever you like. Try it: Push the joystick trigger. You'll hear a beep. Now when you move the cursor, the piece of screen that was under the cursor will

continued on page 156

Atari Help

by Jeff Brenner

In January's "Atari Help" column, Andrew Leo Eddings of Alabaster, AL had asked about memory expansion for the Atari 800XL. Since I was not familiar with the latest memory expansions available for the 800XL, I asked those readers who produced or were familiar with 800XL memory expansion to write. This month we will all learn about the latest memory expansion available, thanks to the many readers who responded to my call for help.

The treasurer of the Memphis Atari Systems Hobbyists was kind enough to give us a brief history of the recent activity in the 800XL memory expansion area. He writes:

Claus Buchholz published an article in the September 1985 issue of *BYTE* which described the use of 41256 256K-bit dynamic RAMs to expand the 800XL to a full 256K RAM! I built that modification (for under \$30.00) as have

many others. Unfortunately, it bank selected 32K pages (\$0000-\$7FFF) unlike both the 130XE and Axlon and Mosaic expansion mods for the older 800, which bank selects 16K. Buchholz's handler was modified by a CompuServe user named John Radigan. Then Tom Harker of ICD got together with Buchholz and developed a *SpartaDOS*-compatible ramdisk handler for the "256K XL." Now single, enhanced and double densities were supported but no existing software existed for this bank select scheme.

Enter ICD and CDY consulting. Harker (ICD) has introduced the "RAMBO XL" mod which, unlike the original Buchholz mod, allows both the 800XL and 1200XL to be expanded to 256K RAM *plus* providing the same 16K (\$4000-\$7FFF) selection as the 130XE. These mods produced a pseudo 130XE with 256K instead of 128K of banked memory. The ICD unit retails for \$49.95 without DRAMS and the CDY

upgrade sells for \$99.95 with DRAMS (although it too is available without DRAMS for much less).

With the minimal cost of 41256-150ns dynamic RAMs, Atari ought to give serious consideration to producing a "260XE" as both the manufacturing changes would be minimal and now there is little reason for XL owners to buy XEs! The modified XLs are the most powerful 8-bit Ataris in existence! Add two 50k-baud drives (ICD US Doubler or Happy-Modified 1050's) and the Supra Xebic 1410 based controller with a suitable 10MB hard drive and viola! Now what we need is a printer spooler program like that just released for the 520ST!

Bob Allman
Millington, TN

Thomas Harker, president of ICD (1220 Rock Street, Suite 310, Rockford, IL

continued on page 161

Atari Book Reviews

by Jeff Brenner

Atari XL User's Handbook

Here's the book Atari should have included in the box with the Atari 800XL. The *Atari XL User's Handbook*, (360 pages, Weber Systems, Inc., 8437 Mayfield Road, Cleveland, OH 44026, \$15.95), was written by the staff of Weber Systems and covers a wealth of

topics ranging from an introduction of bits and bytes, to writing a joystick-controlled game program.

The first two chapters of this book provide an introduction to the XL computers inside and out. The various chips are discussed, including the 6502C microprocessor, Pokey, Antic and GTIA, as well as the keyboard and peripherals such as

the 1050 disk drive, printers and modems. An easy to understand section on setting up the XL and connecting the peripherals is the first thing an 800XL owner will want to turn to.

Chapter 3 contains an "Introduction to the Atari BASIC," which is particularly important, since a discussion of Atari BASIC was noticeably

lacking from the XL manual included with the computer. The chapter describes error messages, entering and editing a program with the Atari's special editing keys, and running, saving and loading the programs. Additional sections in this chapter cover strings, numeric data, variables, operators and the order of evaluation. The specifics of Atari BASIC are covered in the following two chapters, which focus on the input/output commands, variable arrays, mathematical functions, and file handling. The short sample programs provided are appropriate and demonstrate good applications of the com-

mands being discussed. For example, Chapter 5 concludes with the construction of a simple database program that employs most of the file handling commands discussed previously in the chapter. My only complaint about this section of the book is that the authors should have gone into more detail on the peculiarities of the Atari's string handling, particularly in comparison to the string handling of Microsoft BASIC.

The graphics and sound of the Atari XL are introduced in Chapter 6. This is really the

continued on page 160

Atari Introduces 1040ST Sends 520ST To Chains



New Atari 1040ST Computer

Atari is now selling their new successful high performance personal computer, the 520ST, to mass market stores. Simultaneously, the company is introducing an even more powerful computer, the 1040ST (1024K), for exclusive distribution by computer specialty dealers.

In addition to the 520ST and over 150 ST software programs, Atari is showing several other new products, including a 130XE bundle consisting of the powerful 128K personal computer with mouse, printer, disk drive and five software titles, *Silent Butler*, *Star Raiders*, *Music Painter*, *Paint*, and *AtariWriter*, a word processing program—all for an expected retail price of \$399.

According to Atari president Sam Tramiel, "With the introduction at CES of exciting new products and programs,

we are announcing that this is the 'new' Atari, a revitalized company with a clear claim to several market segments. We're the fastest-growing manufacturer of popularly-priced computers and the leading manufacturer of video games."

Consumer demand for the 520ST convinced Atari that the machine was suited for broad distribution channels. Atari executive vice president Michael V. Katz explained, "The 520ST is aimed at the computer user who wants to trade up to a 16-bit system. We think the 520ST is the right machine at the right price for this user."

Distinguished from its original design, the 520ST will have a built-in RF modulator; the basic unit will retail for under \$400. A bundled system comes complete with a 3.5-inch disk drive, mouse,

black-and-white monitor and four software packages for under \$700 and with color monitor for under \$900.

A growing software library is available for the ST computers, with 150 titles now in stores, and a minimum of 100 additional programs scheduled for release in the first quarter of the year. Over 1500 developers worldwide are doing development work on the ST computers, including such leading American companies as Spinnaker, Sierra On-Line and Activision.

Atari dealers are less enthusiastic about the announcement. One very active dealer said "This is the same Tramiel tactic used at Commodore, I am sick of doing his pioneering work only to have KMart reap the profit." Dealers feel that the existence of a cheap 520ST will dilute their sales. ●

Computereyes Graphics 9 Mode Compatibility For Atari Computer

Digital Vision, Inc., announces the availability of Graphics 9 Mode Compatibility Software to further enhance the performance and compatibility of its popular Computereyes Video Acquisition System. Computereyes is the company's innovative slow-scan device that connects between any standard video source (video camera, videotape recorder, video disk, etc.) and the computer allows the user to acquire images into the high-res memory of the computer. Under simple software control the user can acquire images in either the Atari Graphics 8 mode (highest resolution), or Graphics 7.5 mode (graphics tablet compatible) and now in the Graphics 9 mode.

In the Atari Graphics 9 mode, resolution is sacrificed for the ability to display 16 shades of true grey. COMPUTER EYES images acquired in this mode are superb! (See screen photo of Graphics 9

mode acquired image). The Computereyes Graphics 9 Mode Compatibility Software includes all of the image capture routines and features of the standard software including save-to-disk capabilities so that the images may be loaded into other popular image manipulating and printing programs. The enhancement includes disk and users manual and is available for a nominal fee.

Computereyes is available for Atari 800/800XL/130XE computers, Commodore 64/128 computers, and the Apple II+, IIe, and IIC series computers. Versions for the Atari ST and IBM PC will be available in the early part of 1986.

For further information, review systems, photos, etc. please contact: Digital Vision, Inc., 14 Oak Street - Suite 2, Needham, MA 02192, 617-444-9040, 449-7160

Mention that you read about it in *Computer Shopper*. ●



ATARI ST

Atari 520ST Double Sided Boot Disks

by Bruce Laubheimer Jr.

The Atari 520ST is shipped from the factory with a single sided (360K) boot disk. While this is not a problem for most users, it was for myself. One of the first equipment changes I made was to sell my single sided drive and purchase two of the SF314 double sided drives when they became available in August. Purchasing one of the double sided drives would have helped the situation to some extent; but, switching to identical drives prevented segmentation of my library in to both double sided and single sided formats. This change also allowed placement of the complete ALCYON compiler, linker and Micro EMACS on one disk with drive "B" used as a data disk for all of the temporary files. The only problem remaining was that the system boot code took up almost all of a single sided disk with the desk accessories and the TOS files. A double sided boot disk allows you to place most of the files used on a normal basis on one disk and lessens the possibility that the boot disk would have to be removed from Drive "A" each time the system was boot-ed up.

Generally a copy of a boot disk is made by using a sector copy. This is accomplished on the ST by selecting and dragging the source drive icon, to the destination drive icon. Sector copying may only be used if the source and destination drives are of the same configuration. Copying from single to double, double to single, or physical drive to RAM disk is not allowed in sector by sector mode. The exchange information between drives or disks of differing format requires the use of a file by file copying procedure. The obvious constraint to using this method is that the information must be in "file" form, and it must be in the disk directory. The boot sector may only be copied with sector copying, therefore a program had to be written allowing the transferrence of a single sided boot sector to a double sided disk.

The first step was to write a C program that would copy just the boot sector from one disk to another. As insignificant as this may seem, it allows new single sided boot disks to

be made without the fragmentation that occurs when a disk has had a number of files written to, and deleted from it. Generation of a "disk full" error code on a write operation, when the disk directory indicated that there was enough room for the new file, normally indicates some degree of fragmentation. Sector copying the whole disk will reproduce the data as well as the fragmentation. To make a clean boot disk, copy just the boot sector to the new disk, and use file by file copying for the rest of the information.

There are a few words of caution before the program discussion starts. These programs are not error trapped. Any major problems should be caught by the TOS low level routines, but there are no guarantees that those routines will prevent destruction of important data on the destination disk. These programs were written in a "quick and dirty" manner; obviously they are not as polished as commercial programs. I make no apologies for the lack of error trapping. When TOS becomes available on ROM there will be no need for a boot disk, and these programs are intended as an interim solution. If you do not feel confident in the use of these programs, do not use them without proper precautions. Those precautions being, write protect your source disk,

format your destination disk before starting, and make sure you write the proper type of boot sector to the disk.

What could go wrong? Writing a single sided boot sector to a single sided disk probably will not do any damage. Writing a single sided boot sector to a double sided disk will convert the new disk to single sided. If you do that to a double sided disk that already contains files, it will hopelessly scramble the directory as well as the files on the disk.

For the following discussion, refer to program listing number one. The first seven lines comprise a header, constructed from comment lines. This is used mainly as an indexing aid for storage of source code. The program actually begins with the #include statements. These statements instruct the C language preprocessor to include those header files with the source code while the program is being compiled.

The next statements are the variable declarations, which are a required part of the C language. The first batch of variables are declared to be integer, and are well documented as to usage in the source code. However, some of the choices for these variables do require some further explanation. The "disktype" variable:

continued on page 66

```

/*****
/*
/*  SS/DD Disk boot sector generator
/*
/*  by Bruce Laubheimer Jr.  11/26/85
/*
*****/

#include <osbind.h>
#include <stdio.h>

int  i, offset,
    disktype = 2, /* 80 tracks single sided */
    execflag = 1, /* Make the boot sector executable */
    devno = 0,    /* Operations on the "A" disk drive */
    sectno = 1,   /* Sector number to write to */
    trackno = 0,  /* Track number to write to */
    sidenno = 0,  /* Side number to write to */
    count = 1;    /* Number of sectors to write */

long int filler,
    serialno = 0x1000000; /* Generate a random serial number */

/* Apparently the Protobt function call likes new serial numbers */

char buffer[ 0x200 ];

intro()
{
    printf("===== \n");
    printf(" Boot sector generator for single sided disks \n");
    printf(" by Bruce Laubheimer Jr.  11/26/85 \n");
    printf("===== \n");
    printf("\n\n");
}

wait_key()
{
    printf("\n*** Hit any key to continue ***\n\n");
    Bconin(2);
}

read_boot_sector()
{
    printf("Place a write protected system boot disk in drive A\n");
    wait_key();
    printf("*** Reading boot sector into memory ***\n\n");
    Floprd( &buffer, filler, devno, sectno, trackno, sidenno, count);
}

write_boot_sector()
{
    printf("Please place a formatted single sided disk that you wish to\n");
    printf("have a boot sector written on, in drive A. ( non-protected )\n");
    wait_key();
    Floprw( &buffer, filler, devno, sectno, trackno, sidenno, count);
    printf("*** Boot sector successfully written to new disk ***\n");
}

main()
{
    intro();
    read_boot_sector();
    Protobt( &buffer, serialno, disktype, execflag );
    write_boot_sector();
    wait_key();
}

```

Free Software For The Atari 520ST

by W. Rostek

Like all new machines, the Atari ST has been hampered by a lack of software. It's the standard Catch-22 of the micro computer industry. Computers are hard to sell without software, and you can't sell software unless there are a lot of computers in the hands of customers. Early Macintosh and IBM PC users are sure to remember the long wait between getting their computers and having the software selection that they now enjoy.

ST owners are now experiencing the same frustration, but it will be for a much shorter time. Software is showing up for the STs faster than it has for any previous micro. This

reflects the maturing of the personal computer industry. And the faith many software developers have in the future of the ST line.

While the majority of new and upcoming ST programs are destined for your local computer stores' shelves. There is already a respectable amount of public domain software. Yes, that's right, FREE programs. The number and quality of these programs is amazing, especially on a system as new as the Atari 520ST. Three of the PD programs really stands out in the crowd and would be a welcome addition to any software collection. Free or not, ST Writer, NEOchrome, and Megariods are good programs.

As the name implies ST Writer is a word processing program for the ST. What is surprising is that ST Writer is an updated version of Atari Writer. Atari Writer, as many of you know, is one of the most popular word processing programs for the 8-bit Atari systems. The ST version has all the features of its predecessor with a few enhancements. Not the least being the STs 80 column display. A vast improvement over the 40 columns that the older machines have.

The program starts by presenting you with a menu of more or less standard word processing options. Such as Create File, Delete File, Edit File, Load File, Print File, Save File, Index of Files, and

Quit. All normal and fairly obvious commands.

But added to these are a few different ones. Format Disk, which is a very nice option allows you to format a blank disk without exiting the program. This can come in very handy if you have spent a long time creating a file and then realize that you didn't have a formatted disk to save it to, or are out of room on your working disk. Granted this shouldn't happen if you think ahead but it's nice to have just the same.

HIRES Flip-Flop, switches the Hi res. display between 22 lines and 37 lines. This allows users with the monochrome

continued on page 66

Atari 520ST continued from page 65

- 1 = Leave the existing disk type information alone.
- 0 = 40 tracks single sided (IBM 180K)
- 1 = 40 tracks double sided (IBM 360K)
- 2 = 80 tracks single sided (ATARI SF354 360K)
- 3 = 80 tracks double sided (ATARI SF314 720K)

The "execflag" variable:

- 1 = Leave the existing execute flag alone.
- 0 = Non executable boot sector.
- 1 = Executable boot sector.

The "devno" variable, 0 = Drive A, 1 = Drive B.

The next declarations in this program are for long integer type variables. The "filler" variable is just an unused long word in both the sector read and sector write XBIOS function calls. The "serialno" variable is set to a hex value of one million, this forces the boot sector prototyping function call

to generate a new 24 bit random serial number. If "serialno" is set to a value of -1, the documentation states that the existing disk serial number will not be changed. So far, the only way to reliably create boot sectors is to allow the prototyping function to generate a new serial number each time.

The char declaration allocates a character array named buffer to \$200 to 512 bytes, which is the size of one sector. This is the area that the boot sector information will be stored.

The "intro" function just prints a display on the screen as a reminder of which program is currently running. The "waitkey" function uses a BIOS function call to await a keypress at the console. One note: in the ATARI ST BASIC sourcebook, the keyboard is listed as device 4 for both the INP and OUT commands. Use device 2 (the console) to get keystrokes, device 4 is the intelligent keyboard controller.

The "readbootsector" function reads a boot sector from a single sided disk and stores it in

the character array named buffer. The "protobt" or prototype boot function in the main function of this program manipulates specific bytes of the boot sector allowing it to become executable. The actual boot code is not changed, the only things that are changed in this case are the disk serial number in the sector header, and the checksum word at location \$1FE in the first sector. For a boot sector to be executable, it must checksum to the magic vale of \$1234. The "writebootsector" function takes the new boot sector that has been prototyped in memory and writes it to a single sided disk.

To use this program, compile and link with the Alcyon C package and rename the file to BOOT1S.TOS. Format a single sided disk before you run the program. When the program is run, you will be prompted to insert your boot disk into drive A. Once that is completed, press any key and the boot sector will be read into memory. The program will prompt you to insert a formatted disk into drive A, press any key and the boot sector will be written to the new disk. The program should print a successful completion message and after another keystroke, it will return you to the GEM desktop. At that time, drag the TOS.IMG file by itself to the new disk, and then any other files that you wish to have on the disk. This procedure assures that the TOS.IMG file is the first one on the disk and is the configuration which gives the fastest system boot up time.

Now look at table number 1. This is an overview of the space allocation and the defaults that are found in a standard 520ST boot sector. You will notice

that the only things that are different between single and double sided disks are: the total number of bytes per disk, the media descriptor, and the number of sides on the media. Although, the media descriptor byte is documented as being unused, it is not the same on each type of disk.

Program listing number 2 is the logical extension of program 1. The additional code declares three static character arrays and a new function named "setdouble." The purpose of this code is to define the new double sided disk parameters, and then write them into the appropriate locations of the prototyping buffer. The "protobt" function call then generates a new random 24 bit serial number, computes the sector checksum and adjusts the checksum word at locations \$1FE. The new sector will now checksum to the magic value of \$1234 and will be executable.

Compile and link as was done with program 1. Rename the file to BOOT2S.TOS. Before the program is run, format a double sided disk. This program runs as did the first one, except you will be prompted to insert a double sided disk on which the boot sector is to be written. Good luck. The programs do work and as a side benefit, the double sided boot disks boot up considerably faster than a single sided boot disk. This is mainly due to a reduction in disk access times directly related to the disk drive stepper motor response time.

The executable form of these programs as well as the C source code is available from the National ST Users Group, 3650 Sand Court, Mims, FL 32754; BBS number (305) 383-1413.

Free Software continued from page 65

monitor to get more text on the screen. People with color monitors have to stay with the 22 line screen.

Transform colors reverse screen colors black to white and vice-versa. This allows the user to pick which he or she prefers, white letters on a black screen or black on white. Those with color monitors can also preset the text and background colors before starting an editing session. The nice thing about the ability to flip-flop the background and text colors is that it helps to relieve eye strain during long editing sessions. It's amazing how a little thing like this can make a program so much nicer to use.

The last menu option shows that Atari hasn't forgotten the 8-bit Atari users who are moving into the 16-bit systems. This is Receive file from 850. Which allows people with a lot of Atari Writer files on their old system a simple method of transferring them to their STs. They even tell you how to construct the necessary cable in the ST Writer documentation.

The editing features of the program are powerful and easy to use. Block moves, deletes, search, search and replace (with or without Query), underlining, subscripts, and superscripts. All are done with just a few keystrokes.

The only main feature missing is the availability to work on two or more documents simultaneously, via multiple editing windows. You can merge files together, then use the block moves and block deletes to do the same thing, but it's not as convenient. Also lacking is a good mail-merge system. They do provide a way to do it but it's clumsy and not one of the strong points of the program.

Also lacking are any of the advanced GEM features available on the ST. No drop-down menus or any other form of on screen help. All on screen text is displayed in the default text font, and no on screen boldface or underline.

Where ST Writer does shine is in its text formatting and printing capabilities. Just about any formatting commands you may need are available. Including many commands to take advantage of your dot matrix printer's ability to print different fonts. The print options allow easily controlled printer operation. The ability to print to the screen to preview your work before committing it to paper. You can also print your work to a disk file. Perfect for creating on

```

*****
/*
/* DS/DD Disk boot sector generator
/*
/* by Bruce Laubenheimer Jr. 11/27/85
/*
*****
#include <osbind.h>
#include <stdio.h>
int i, offset;
disktype = 3; /* 80 tracks double sided
execflag = 1; /* Make the boot sector executable
devno = 0; /* Operations on the "A" disk drive
sectno = 1; /* Sector number to write to
trackno = 0; /* Track number to write to
sideno = 0; /* Side number to write to
count = 1; /* Number of sectors to write

long int filler;
serialno = 0x1000000; /* Generate a random serial number */

/* Apparently the Protobt function call likes new serial numbers */
char buffer[ 0x200 ];
/* Set up defaults for prototypical double sided boot sector */
/* Two byte character arrays are in low byte / high byte order */
static char sectors[ 2 ] = { 0xA0, 0x05 }; /* 1040 double sided sectors */
static char media[ 1 ] = { 0xF9 }; /* Unused? single sided is F8 */
static char sides[ 2 ] = { 0x02, 0x00 }; /* Double sided media
set_double() /* Place the new sector parameters in the buffer */
{
    buffer[ 0x13 ] = sectors[ 0 ];
    buffer[ 0x14 ] = sectors[ 1 ];
    buffer[ 0x15 ] = media[ 0 ];
    buffer[ 0x1A ] = sides[ 0 ];
    buffer[ 0x1B ] = sides[ 1 ];
}
intro()
{
    printf( "*****\n" );
    printf( "*****\n" );
    printf( "Boot sector generator for double sided disks\n" );
    printf( "*****\n" );
    printf( "by Bruce Laubenheimer Jr. 11/27/85\n" );
    printf( "*****\n" );
    printf( "\n\n\n" );
}
wait_key()
{
    printf( "\n*** Hit any key to continue ***\n\n" );
    Bconin(2);
}
read_boot_sector()
{
    printf( "Place a write protected system boot disk in drive A\n" );
    wait_key();
    printf( "*** Reading boot sector into memory ***\n\n" );
    Floprd( &buffer, filler, devno, sectno, trackno, siden, count );
}
write_boot_sector()
{
    printf( "Please place a formatted double sided disk that you wish to\n" );
    printf( "have a boot sector written on, in drive A. ( non-protected )\n\n" );
    wait_key();
    Floprw( &buffer, filler, devno, sectno, trackno, siden, count );
    printf( "*** Boot sector successfully written to new disk ***\n\n" );
}
main()
{
    intro();
    read_boot_sector();
    set_double();
    Protobt( &buffer, serialno, disktype, execflag );
    write_boot_sector();
    wait_key();
}

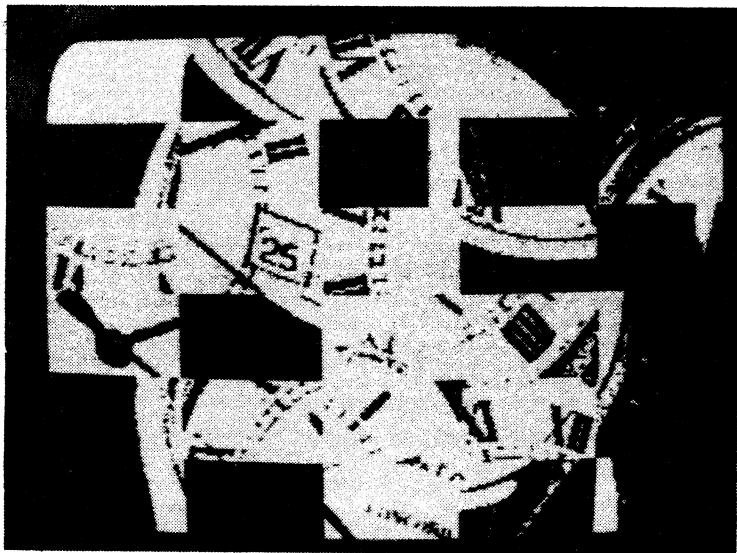
```

Table 1 ATARI 520ST Boot sector usage and defaults

Bytes	Nomenclature	SS	DS
\$00 & \$01	Branch to boot code	\$60, \$38	Same
\$02 - \$07	Loader reserved bytes	"Loader"	Same
\$08 - \$0A	Volume serial number	Unique	Same
\$0B & \$0C	Bytes per sector (512)	\$00, \$02	Same
\$0D	Sectors per cluster	\$02	Same
\$0E & \$0F	Reserved sectors	\$01, \$00	Same
\$10	Number of FATS	\$02	Same
\$11 & \$12	Directory entries	\$70, \$00	Same
\$13 & \$14	Total sectors on media	\$D0, \$02	\$A0, \$05
\$15	Media type (unused)	\$F8	\$F9
\$16 & \$17	Sectors per FAT	\$05, \$00	Same
\$18 & \$19	Sectors per track	\$09, \$00	Same
\$1A & \$1B	Sides on media	\$01, \$00	\$02, \$00
\$1C & \$1D	Hidden sectors (unused)	\$00, \$00	Same
\$1E - \$1FD	Reserved for boot code	NA	Same
\$1FE - \$1FF	Checksum word	See text	Same

Note: all values are in Low byte / High byte order

Applying the Atari continued from page 63



Mixed-up Digitized image

move with it! You can now place this piece of screen down wherever you like by pressing the trigger again. What hap-

pens to the section of the image that you just covered with the moved piece, you ask? It is automatically placed in the



A solved puzzle

blank space that the original piece was taken from. Hence, when you move one piece to another, the two exchange places.

Scrambling The Screen

Now for the fun stuff. When you press and hold down the OPTION key, the image on the screen will be mixed up. The longer you hold down the OPTION key, the more the pieces of the picture will be mixed up. Photo 2 shows the picture of the watch after a few seconds of scrambling. When you release the OPTION key, the timer starts. Now use the joystick to put the picture back together.

The Space Bar

At any time while solving the puzzle, you can press and hold down the space bar to see the completed puzzle. When you release the space bar, your unsolved puzzle will return to the screen. The space bar is particularly useful when you first start solving the puzzle, since it allows you to check that you're putting the pieces in their correct positions.

Solving The Puzzle

As soon as you think you've solved the puzzle, press the START key. If your Atari responds with a menacing buzz, you'll know that you've left some pieces out of place. A short, pleasant melody tells you when you've correctly solved the puzzle, and your time and score will be displayed. Photo 3 shows a puzzle that has just been solved. The time was 7 minutes and 43.71 seconds.

After a puzzle has been solved, you are given the option of trying the same puzzle again, or a new one. If you're playing with a group of people, you'll want each person to try to get the best score on the same puzzle, since each puzzle varies in complexity and difficulty.

Hints and Strategies

Naturally, it's a good idea to look for recognizable pieces when you begin solving a puzzle. For example, if the puzzle is the face of a person, you'll want to look for the eyes and get those into place before continuing with the rest of the puzzle. In the watch picture, the Roman numerals are of great help in putting the picture together, which is why this puzzle is particularly well suited for beginners.

You'll find that some pictures make easy puzzles, while others make incredibly difficult puzzles. Generally, the more defined and clear the original image is, the easier the puzzle will be to solve. In any case, the more you solve a particular

pd
Precision Data Products
Complete Line of Quality Supplies for Your Computer

TOLL FREE ORDER LINE
800-258-0028

FOR INFORMATION CALL
616-452-3457

INTRODUCING

STATE-OF-THE-ART MAGNETIC MEDIA
RIGOROUS QUALITY CHECKS ENSURE THEIR RELIABILITY

FROM ONE OF THE LEADING MAGNETIC MANUFACTURERS IN THE WORLD

5 1/4" DISKETTES

- With Hub Rings
- With Write Protect Tabs
- With Static-Free, Dust-Free Envelopes
- With User ID Labels
- In Factory Sealed Poly Packs

(YOU GET EVERYTHING BUT THE BOX) — PRICES ARE PER DISK

QTY.	50	100	500	1000
SSDD	.59	.56	.52	.49
DSDD	.64	.61	.57	.54

3 1/2" DISKETTES

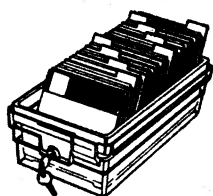
25/Poly Pack

Single Side HD 135TPI..... \$1.65 Each

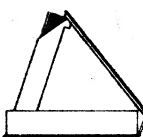
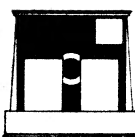
Double Side HD 135TPI..... \$2.35 Each

INDIVIDUALLY CERTIFIED 100% ERROR FREE • COVERED BY A FULL LIFETIME WARRANTY
MEET OR EXCEED APPLICABLE ANSI, ECMA, ISO STANDARDS

ADD ON SPECIALS



THE 100 FILE
With Lock for
100 5 1/4" Diskettes
Each..... \$10.95
Plus \$2.00 S & H



LIBRARY CASES

Holds 15—5 1/4" Diskettes
\$1.00 plus 50¢ S & H

READY FOR IMMEDIATE SHIPMENT

Minimum order: \$25.00. A Discount for 300 or more diskettes. Add 10% for less than 50 diskettes. **Shipping and Handling:** \$4.00 per 100 diskettes. Reduced shipping charge for larger quantities. C.O.D. add \$4.00. Cash or certified check. MI residents add 4% sales tax. Prices subject to change without notice.



Precision Data Products

P.O. Box 8367, Grand Rapids, MI 49518
(616) 452-3457 • Michigan 1-800-632-2468
Outside Michigan 1-800-258-0028



C.O.D.

Atari Book Reviews continued from page 64

only chapter that disappointed me. The many Atari graphics modes are only briefly discussed, and the sound command is hurriedly mentioned in a few brief paragraphs. I suspect that the authors did not feel it was necessary to spend the time that a more complete consideration of the Atari's graph-

ics and sound capabilities would entail. But considering the amount of space given to other topics in the book and the significance of the Atari's graphics and sound capabilities, this section is very much incomplete.

A separate chapter on DOS usage will be a welcome relief to new Atari owners mystified by DOS. A detailed explanation of each of the commands

of DOS 2 and the infamous DOS 3 appear in this chapter, along with a generous number of examples.

Chapter 8 may prove to be the most useful for those learning to use Atari BASIC. This chapter is an Atari BASIC Reference Guide and lists each command of Atari BASIC along with a description and an example of its use. In this chapter, the authors partially

redeem themselves for their lack of Chapter 6 graphics information, in part by devoting more than ten pages to the COLOR statement. Unfortunately, the sound statement is still neglected here.

The appendices of the *Atari XL User's Handbook* provide an explanation of error messages, a chart of Atari ASCII character set, pinouts for the monitor, serial I/O and joystick jacks, and a listing of important peek and poke locations on the Atari.

Overall, the *Atari XL User's Handbook* is a well-written, practical handbook that contains lots of practical information for new users of the Atari XL computers. The only thing lacking is a discussion of the sound capabilities and graphics wonders of the Atari computers, such as player missile graphics, scrolling and display lists. However, the superficial coverage of graphics and sound is greatly compensated by the wide range of other topics that are so thoroughly covered in this book. At \$15.95, the *Atari XL User's Handbook* will prove itself to be a wise investment for the Atari XL owner.

Atari XE User's Handbook

Also published by Weber Systems, Inc. and equally excellent is the *Atari XE User's Handbook*. This handbook is nearly identical to the *Atari XL User's Handbook* but covers DOS 2.5 instead of DOS 3, and includes a chapter on "Advanced Memory Concepts" that discusses bank-switching and how to access the 130XE's extra 64K of memory in BASIC programs. In addition, the section on DOS 2.5 discusses the RAM-disk and its use on the 130XE.

While the 130-page manual included with the 130XE makes it much less crucial to buy a handbook such as *Atari XE User's Handbook*, 130XE owners will still appreciate the additional topics covered in this book and the easy to understand format in which these topics are presented.

Presenting The Atari ST

This is the first in a series of books on the Atari 520ST from Abacus Software (P.O. Box 7211, Grand Rapids, MI 49510). Presenting the Atari ST was written by L. English and J. Halkowiak and was originally published in Germany by Data Becker.

This 197-page book begins with an introduction of the registers and the instruction set of the 68000, the microprocessor of the Atari 520ST. The next chapter covers the architecture of the Atari ST, taking the reader from the RAM and ROM layout of the ST, to the peripheral interfaces (floppy disk, printer, hard disk, DMA, serial RS 232, MIDI, joystick and video interfaces). Included in this chapter is a detailed discussion of the ST's multifunction peripheral chip (the MFP 68901) and the sound capabilities.

Additional chapters in the book cover the ST's own operating system, CP/M, GEM and the mouse, and programming languages. A special chapter on LOGO presents a simple introduction of the commands of this language.

Presenting the Atari ST provides a general overview of a wide range of topics on the 520ST, but it should be stressed that this is not a hands-on guide. Most of the information is presented in a very general manner, with few examples or sample programs. The few sample programs that are included in the book are used to illustrate the 68000 instruction set, and are therefore in assembly language. But for those wishing to learn more about the 520ST before buying, or those who want to get a general understanding of the various aspects of this machine before diving into technical notes and programming books, *Presenting The Atari 520ST* is a good choice, especially since it is one of the few sources of general information on this new machine.

KNAPCO

2 Drives W/Dual Enclosures
And Power Supply \$169.95

* NEW 3M WISPERWRITER * TREND COM 200

High-Speed
Intelligent
Printer
10 (1)
\$44.95

- NEW \$49.95
- BUILT FOR LARGE OEM
- FULL PAGE THERMAL PRINTER
- 40 CHARACTERS PER SECOND
- CONTINUOUS GRAPHICS
- 80 CHARACTERS PER LINE UTILIZING A FULL 96 CHARACTER ASCII SET
- FULL LINE BUFFER - BI DIRECTIONAL
- DATA & INFO INCLUDED

BLOCK FANS

- 3" ETRI, Torin (Clean Pulls)
\$3.95 \$2.95 (100)
- 3" ETRI (New) Reg \$14.95
\$5.95 \$5.25 (25) \$4.00 (100)
- 4 1/2" 220 V. New \$5.95
- 4 1/2" 110 V. New \$5.95
Clean Pulls \$3.95 \$2.95 (100)

SMARTCAT MODEM

- Built-in Dialer (Touch-Tone or Rotary)
- Auto Answer
- Direct Connect
- Analog & Digital Loopback Test
- Extensive Software Command Set
- Busy Detect (Allows Modem to Be Programmed to Redial)
- 103/212 Smart-Cat Modem 300 or 1200 Baud Full Duplex

300/1200 \$124.50

WORKS IBM/APPLE \$199

W/SOFTWARE REG. \$95

Novation

SEND FOR
FREE
CATALOG

or call us at
(813) 392-0406

STAND BY POWER SUPPLIES TRIIPP LITE

SB200
SB400
SB1000

- 200 WATT * REG. \$249. OUR PRICE \$199.
- 400 WATT * REG. \$359 NOW \$269.
- 1000 WATT * REG. \$699 NOW \$479.
- PLUGS INTO AC, CHARGES BATTERY, LOAD SWITCHES ON DEMAND TO POWER YOUR COMPUTER WHEN POWER FAILS.

COMPLETE UPS SYSTEMS

- BLACKOUT AND BROWNOUT PROTECTION WITH BUILT-IN SPIKE AND NOISE PROTECTION
- BC-200 * REG. \$359.00
OUR PRICE \$259.00
- BC-425-FC * \$395.00
- BC-1000-FC *
REG. \$1179.00 NOW \$875.00

LINE CONDITIONER PREVENTS BROWN OUTS

- LS-600 (SA. \$119.00) \$89.00 LOW VOLT. ONLY
- LC-1200 (10A. \$449.00) \$159.00 LOW-HIGH VOLT
- LC-1800 (15A. \$699.00) \$219.00 EMI-RFI + SURGE

QUMETRAK DISC DRIVES

142 1/2 H.T.
DSDD-48 TPI \$72.50
(2-6) \$69.95
DIRECT P.C. REPLACEMENT \$129. REG.

ISOBAR LINE FILTERS

IB 2-0 WALL MOUNT
1 FILTER NET \$48.00
SPECIAL \$32.00

IB 2-6 6' CORD 1 FILTER \$69.95 \$39.00

IB 4-6 6' CORD 2 FILTERS \$79.95 \$53.00

IB 8-15 12' CORD 4 FILTERS \$109.95 \$72.00

C C 18-15 CONSOLE W/ABOVE \$169.95 \$113.

New Spike Bars RFI And Spikes

SK6-6 REG. \$49.95

\$37.95

6 OUTLET BAR W/6 FT. CORD

6'33.50 EA. 12'29.95 EA. 24'26.50

KEC LINEAR SUPPLY

+5V. 13A.
+12V. 1.3A.
-12V. 1.8A.

\$34.95

5 1/2" x 9" 15 LBS. 3" \$99.95

MODULAR, ENCLOSED CASE

DUAL FLOPPY DRIVES/POWER-ONE CP-412

+5V. 5A.
+12V. 5A.
-5V. 5A.
SPECIAL \$24.95

2" \$42.50

MOTOROLA PALLET LOAD

CRT DISPLAY MONITORS

DS4003 P-39 \$49.95

PARADYNE PDS MONITOR WITH FULL CABINET \$69.95 2" \$129.95

ELECTRA-POWER SENTRY

ELIMINATES RFI AND SPIKES

• LEVITON 3 OUTLETS, OVERLOAD PROTECTED \$11.88

W/INDICATOR 6" \$9.95

12" \$8.95 24" \$7.95

A-B SWITCH

ALL 25 PINS CONNECTED

4" X 3" X 1" ALL FEMALE RS 232

PUSH SWITCH

FROM ONE COMPUTER \$39.50

TO 2 PRINTERS \$59.50

A-B-C-D \$49.50

A-B-C-D PARALLEL \$69.50

MODERN SPIKE PROTECTION

TSB \$59.95 NOW \$38.95

800 WATT UPS

UPSC 800 REG. \$995.00

NOW \$849.00

CORCOM RFI FILTERS

DUAL "W" EMI RFI FILTER

1096 CORNELL-DUBLER

\$5.95 \$1.99

CONNECTORS

MALE CENTRONICS

3.00 SOLDER CUP

\$5.25 FOR RIBBON

CARD EDGE

100 CNTRS. RIBBON CABLE,

34 PIN \$2.49

40 PIN \$2.85

50 PIN \$3.45

RIBBON CABLE

"D" SUBS

25 PIN MALE \$3.50

FEMALE \$4.25

SOLDER CUP "D"

MALE \$1.00 FEMALE \$1.00

VISA

H.J. Knapp of Florida, Inc.

4750 96th St. N. St. Petersburg, Florida 33708

for PC jr.
DISK DRIVES
WITH CONTROLLER

\$299

ATR 8000

WITH CP/M

\$350

DISK DRIVES SS \$99.95

TANDON 10MEG

HARD DISK

ST603S

\$195

ATARI

ATR8000 64K

HARD DISK DRIVE

\$499

5 1/4" DISK DRIVE CASES w/Power

SINGLE 1/2 Ht Cases w/Power.. \$44.95

DUAL 1/2 Ht Cases w/Power.. \$55.95

HARD DISK Single w/Power \$99.95

SINGLE 1/2 Ht Case Only \$19.95

DUAL 1/2 Ht Case Only \$29.95

5 1/4" DISK DRIVE CASES W/POWER SUPPLIES

- Cases accommodate all standard 5 1/4" drives
- New chip resistant finish
- Over current and over voltage protection
- Dealer inquiries invited
- Call or write for quantity discounts
- Guaranteed in writing for 120 days

Dual Power Supplies

- Horizontal - 12x12 1/2 \$69.95
- Vertical - 7x12x6 \$69.95
- Single Horiz. P/S - 6x12x3 1/2 \$44.95
- 2-Drive Cable \$21.00
- 4-Drive Cable \$32.00
- Dual Case, Horiz. or Vert. (W/O P/S) \$29.95
- Single Case, Horiz. (w/o P/S) \$21.95

SINGLE 8" SS DRIVE ATR READY \$199

DUAL 8" SS DRIVES ATR READY \$349

CO-POWER BOARD W/1MB RAM CALL

FOR IBM & COMPATIBLES. INTERNAL MOUNT:

10 MB HARD DISK \$499 W/CONTROLLER

20 MB HARD DISK \$549 W/CONTROLLER

COMPUTERS

COLUMBIA... \$1200

CORONA... CALL

COMPURO

2 HD 16MB EA CALL

ACTRIX PORTABLE CP/M & MS-DOS

Built-In Printer, 2 Modems \$1895

PRICES MAY BE LOWER AT TIME OF PUBLICATION

TERMS: Personal checks allow 14 days, COD, MO.,

Certified Checks... Credit Cards and 3.5%

Shipping and handling: \$2.00 plus current UPS or

Parcel Post rates.

ORDERS ONLY 1-800-351-0295

IB COMPUTERS 503-297-8425

1519 S.W. Marlow, Portland, OR 97225

PUT ALL CABLES &
POWER SUPPLIES INTO
ELEGANT BOX UNDER
YOUR MONITOR.

CENTRAL SWITCH.
ROOM FOR 3RD DRIVE
POWER SUPPLY. FAN

SALE!

MINDSET COMPUTERS
MODULES
SOFTWARE

ATARI WE SELL EVERYTHING
FOR ATARI

SCHOOLS NOTE: NETWORK
4 Ataris to Drive and/or Printer
ONLY \$125 + CABLES

WE STOCK
TI OWNERS CORCOMP STUFF

dBASE to C

Produce quality C direct from
dBASE code with the dBase
translator. For MSDOS, UNIX,
XENIX, MAC and AMIGA

Only From:

Desktop A.I.

1720 Post Rd. E. #3 • Westport, CT 06880
(203) 255-3400

Atari Help continued from page 63

61101-1437), writes that ICD's RAMBO XL upgrade "is indeed 130XE compatible in the CPU mode. A computer fitted with this upgrade can run the DOS 2.5 RAMdisk, BASIC XE, PaperClip word processor, and Synfile+, as if it was the 130XE." CDY's upgrade is similarly compatible (CDY, 421 Hanbee, Richardson, TX 75080). Garrett Computing (117 Drury Lane, Slidell, LA 70460) offers yet another "Quarter Megabyte Atari 800XL" upgrade for \$59.95, which includes RAMs. Dan Garrett says his upgrade runs "some 130XE software" although he doesn't mention whether his upgrade performs 16K or 32K bank switching.

I suspect that all of these 256K upgrades were based on Claus Buchholz's original article in BYTE, "The Quarter-Meg Atari," but modified to perform 16K bank switching to make it compatible with the 130XE. I should stress that these upgrades are not completely-130XE compatible. The 130XE has the ability to control whether the 6502 or Antic (or both) sees the extra RAM banked through locations \$4000 through \$7FFF. This permits, for example, a graphics screen to reside in the Atari's normal memory between \$4000 and \$7FFF while a RAMDISK is in operation. The above mentioned 256K upgrades forgo this feature for the ability to bank in the additional 128K of memory. In most cases, the screen memory is above location \$7FFF and there is no problem. But programs that place graphics data between locations \$4000 and \$7FFF will not work properly. Similarly, some 800 or 800XL programs that utilize this memory area for graphics will not work properly unless the additional RAM is disabled (i.e. not using a RAMDISK).

For those of you have read Claus Buchholz's article in BYTE and are comfortable with soldering or have a friend who will help you out (an Atari users group member, for example) Claus has prepared a special treat for us: A modification to his original article that uses 16K bank switching like the 130XE. It is 130XE compatible except as mentioned earlier. Claus writes:

"The procedure for this upgrade is basically the same as in the article except for the following points: If your Antic (U7) part number is CO21697, use the circuit of the figure [Figure 1], excluding the area inside the dotted lines. If it is



Call for programs not listed.

Technical and Other Information (602) 246-2222
TOLL-FREE ORDER LINE 1-(800)-421-3135

LEADING EDGE COMPUTERS MODEL M - IBM PC compatible and runs twice as fast. SPECIAL SALE \$995

INCLUDES:

DUAL 360 K DRIVES
256K MEMORY
7 EXPANSION SLOTS
120 WATT POWER SUPPLY
Limited Quantity
All Computers include
54 utility programs free!

TIME OF DAY CLOCK
WITH BATTERY BACK UP
12" MONO MONITOR
PARALLEL AND SERIAL PORTS
DOS 2.1 INCLUDING GWBASIC
FULL FACTORY WARRANTY

We have over 1000 Software and Hardware items in stock. Shipments on almost all items within 24 hours!

FREE PRINTSET SOFTWARE!

Purchase an Okidata, Citizen, Epson, Gemini or Toshiba Printer and receive at no charge a program to set print characteristics including expanded, compressed, correspondence quality, tabs, etc. In addition you can sell your old typewriter! This program will let you type one line from the computer keyboard, correct it, and then print the line when you hit the carriage return. Perfect to type an envelope or short note, instead of bothering to load your word processor. We have this program on over 200 different computer formats, both CP/M and MSDOS. Retail value \$35.

FREE SOFTWARE!

With over \$100 purchase you will receive a free diskette for your IBM PC with label maker, checker game and banner programs.

— DATA BASE MANAGEMENT SYSTEMS —

Clipper	\$349
Condor III	\$299
Fox and Geller Quickcode	\$145
Fox and Geller Quickreport	\$145
Knowledgeman	\$225
Knowledgeman II	\$299
K Report	\$135
Nutshell	\$55
PFS File	\$78
RBase 5000	Call
Super Sort	\$100

— WORD-PROCESSING —

Easy (MicroPro)	\$89
Leading Edge w/Merge/Spell	\$139
Lexisoft Spellbinder	\$265
Microsoft Word 2.01	\$230
Multimate	\$205
Peachtext 5000	\$145
PFS Write	\$78
Random House Spellchecker	\$36
Samna III	\$265
Volkswriter 3	\$139
Word Perfect 4.1	\$199
Word Plus Spellchecker	\$89
Wordstar 2000	\$238
Wordstar 2000+	\$285
Wordstar Propack	\$238

— SPREADSHEETS —

Lotus 123	Call
Microsoft Multiplan	\$115
Supercalc II	\$145
Supercalc III 2.1	Call

— ACCOUNTING —

TCS Big Four Equivalent of Peachtree Series 4 - Specially Augmented and Customized for your IBM PC Terminal and Printer - GL, AR, PR, AP, CP/M, for PG XT, DOS 1.1, 2.0.
Each Module \$65 For all Four \$249

BPI Accounting Module	\$299
CYMA	Call
Dollars & Pence	\$95
Managing Your Money	\$94
Real World, GL, PR, AP, AR	
Each Module	\$350

— TRANSFER PROGRAMS —

Microsoft Access	\$149
Microstuf Crosstalk XVI	\$89
Move-It	\$79
Remote	\$89
Smartcom II	\$88
Transporter	\$149

— UTILITIES —

Copy II PC	\$19
Copy II PC Board	\$79
Norton Utilities	\$52
ProKey 4.0	\$75
Sidekick	\$32
Superkey	\$36

— PROJECT MANAGEMENT —

Harvard Project Manager	\$199
Microsoft Project	Call
Super Project	\$185

INCREDIBLE VALUE!

Nationally advertised boards for IBM PC and compatibles at giveaway prices.

1 year warranty

5151 Equivalent Keyboards	\$89
Monochrome Board w/Printer Port	\$79
Hercules Graphic Board Equivalent with Parallel Port	\$89
Expansion Board 0 to 576 K	\$59
AST Six Pack Equivalent with game port	\$89
Four Drive Floppy controller	\$45
Color Card without printer port	\$79
Color Card with printer port	\$85
IBM PC CLONE	
256K, 2 drives 7 expansion slots	\$695

— GRAPHICS —

Chartmaster	\$206
Energraphics	\$170
Fontrix	\$99
Gem Desktop	\$29
Gem Draw	Call
Microsoft Flight Simulator	\$30
Microsoft Bus Mouse	\$110
Microsoft Serial Mouse	\$125

— LANGUAGES —

Lattice C Compiler 3.0	Call
Run C Professional	\$169
Microsoft C Compiler	\$239
Microsoft Macro Assembler	\$89
Microsoft Pascal Compiler	\$179
Microsoft Quickbasic	\$65

— BOARDS FOR THE PC —

AST Advantage	\$359
AST Six Pac (384K)	\$259
Hercules Color Card	\$145
Hercules Graphics	\$289
Quad Board Multifunction 0K	\$199
Paradise Five Pak	\$119
Paradise Mod. Graphics	\$249
Quadboard 64K Expandable to 512K w/Serial Port	\$150
Sigma 384K Board w/Clock	\$139
Sigma AT board	\$289
Sigma Maximizer, Multifunction	\$145
STB Chauffer	\$255
STB Graphics Plus II	\$219
Tecmar Graphics Master	\$465

— HARD DRIVES —

Bernoulli 20 1/2 Ht (New)	\$2439
Bernoulli 20+ 1/2 Ht (New)	\$2650
Seagate 20 Internal w/controller	\$499

— MODEMS —

Anchor Express 1200 Baud	\$239
Hayes 1200	\$379
Hayes 1200 B w/Software	\$349
U.S. Robotics Courier 2400	Call
U.S. robotics Password 1200	Call

— RAM —

64K 150NS Chips (Japan - set of 9)	\$9.50
256K Ram Chips (set of 9)	\$27

— KEYBOARDS —

Keytronics 5151	\$169
-----------------	-------

— MONITORS —

AMDEK	Call on all models
Monochrome TTL Monitors	
Amber or Green	\$65
Princeton HX12	\$445
Princeton Max 12	\$169
Princeton SR-12	\$595
Taxan 620	\$397
Taxan 121 Green	\$125
Taxan 122 Amber	\$134

— COMPUTERS —

Corona PC	Call
IBM PC AT	Call
ITT Computers PC Compatible 256K Dual Drive, Mono,MS/DOS	\$1395

ITT XP 80286 IBM/PC Compatible, 512K, Winchester, 3 times faster than an XT, 30% faster than an AT \$2650

Zenith 171	Call
------------	------

— PRINTERS —

CITIZEN	
MSP-10	\$255
MSP-15	\$355
MSP-20	\$329
C ITOH Prowriter Jr	\$219

EPSON - Call on all models

JUKI	
Juki 6100	\$349
Juki 6300	\$685
Juki Tractors	\$120

NEC

3550	\$989
8850	\$1349
P5 Parallel	\$995

OKIDATA - Call on all models

PANASONIC

1091	\$239
1092	\$320
1093	\$429
KXP3151	\$410
STAR MICRONICS	
SG10	Call
SG15	\$369
Call for prices on other models	
TOSHIBA	
1340	\$460
P351	\$1049
P341	\$875

TERMS: Prices include 3% cash discount. Add 3% for charge orders. Shipping on most items \$5.00. AZ orders +6% sales tax. Personal checks - allow ten (10) days to clear. Prices subject to change.

Hours 8 A.M. to 5:30 P.M. M.S.T. - Monday thru Friday
Saturday 10:00 A.M. to 3:00 P.M.



Technical & Other Information (602) 246-2222
TOLL-FREE ORDER LINE 1-(800)-421-3135
WAREHOUSE DATA PRODUCTS
2701 West Glendale Ave., Suite 6
Phoenix, AZ 85051

Applying The Atari
continued from page 156
puzzle, the faster you'll be able to do it. You may find that you can do a thoroughly mixed watch puzzle in close to a minute after enough practice.

Take advantage of the fact that the cursor returns to the opposite side of the screen when it is moved past an edge. For example, if the cursor is on the right side of the screen and you want to move it to the left

side, pushing the joystick to the right is the fastest way, since the cursor will return to the left side of the screen once it passes the right edge.

Certainly make use of the space bar, not only when you start solving a puzzle, but near the end too when you may easily miss those few pieces that are out of place. By pressing and releasing the space bar, you can flip back and forth between the original image and your puzzle screen so that any differences become visible to you.

Picture Diskette

I have assembled a disk full of specially centered, high-resolution digitized pictures that you can use with *PixMix*. Also included on the diskette is an add-on utility that allows *PixMix* to load compressed *MicroIllustrator* files (for Atari Touch Tablet and Koalpad) in Graphics 15 ("Graphics 7.5") four-color format. The "Picture Diskette" is available to readers for \$5.00, postpaid. (See address at end of article.)

Next Month

Reader's questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope (SASE) for a personal reply.

A diskette of the programs listed in this month's column is available from the author for \$7.00, postpaid. Please make checks payable to "Jeff Brenner" an specify your disk drive model.

"Program Perfect" is a utility used to check for typing errors while entering programs from this column. Readers may send \$5 for a diskette or a SASE for a listing of this program.

Address all correspondence to Jeff Brenner, "Applying The Atari 3/86" c/o Computer Shopper, PO Box F, Titusville, FL 32781-9990.

Additional Applying the Atari programs on page 166

...DISK DRIVES...DISK DRIVES...

IBM COMPATIBLE TANDON 100-2 EQUIVALENT

**DOUBLE SIDED
**DOUBLE DENSITY
**30-DAY GUARANTEE

CM 6426 26 MG

**5 1/4"
**FULL HEIGHT
**USED, AS IS

CM 6640 40 MG

**5 1/4"
**FULL HEIGHT
**USED, AS IS

LARGE QUANTITY
BUYERS PLEASE!

Call for more floppies and hard disk drives available in stock!

VISA (818) 998-7444

PRICES SUBJECT TO CHANGE

SZ & COMPANY

9036 OWENSMOUTH AVENUE
CANOGA PARK, CA 91304

DIGITIZED PICTURE DATA

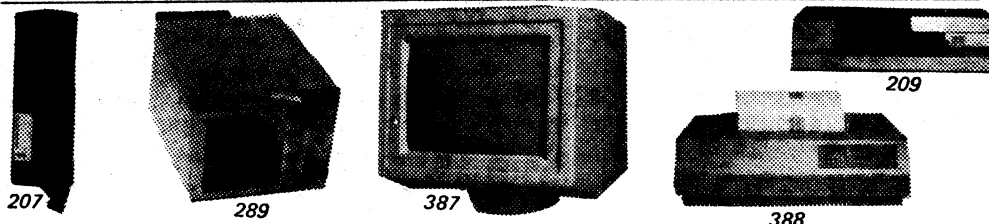
```

SCE 10 REM DIGITIZED PICTURE DATA LOADER
ESE 15 S=1:C=0:PRINT CHR$(125):"COUNTDOWN: ":POKE 752,1:OPEN #1,4,"K:"
ONE 20 DIM A$(3840),C$(40),C2$(55):C$(40)=CHR$(0):C$(40)=CHR$(0):C$(2)=C$(0)
GTE 25 C2$(55)=CHR$(255):C2$(55)=CHR$(255):C2$(55)=CHR$(255):C2$(55)=CHR$(255)
DHE 30 POSITION 14,0:PRINT 3840-S;"
KDE 35 READ N:IF N>0 AND N<255 THEN A$(S)=CHR$(N):S=S+1:GOTO 30
CLE 40 IF N=-1 THEN GOTO 55
MJE 45 READ A:IF N=0 THEN A$(S)=C$(1,A):S=S+A:GOTO 30
VLE 50 A$(S)=C2$(55)(1,A):S=S+A:GOTO 30
RXE 55 POKE 752,0:PRINT "SAVE TO CASSETTE OR DISK (C/D)?":GET #1,N
MWE 60 PRINT CHR$(N)
IGE 65 IF N<67 OR N>68 THEN 55
BSE 70 PRINT "PRESS START TO SAVE"
LZE 75 IF PEEK(53279)<>6 THEN 75
OEE 80 IF N=68 THEN PRINT "SAVING AS CLOCK.PIC":OPEN #2,0,"D:CLOCK.PIC"
WXE 85 IF N=67 THEN OPEN #2,0,128,"C:"
PKE 90 FOR I=1 TO LEN(A$) STEP 40
MDE 95 PRINT #2:A$(I,I+39):A$(I,I+39):NEXT I:CLOSE #2
NWE 100 PRINT "COMPLETED.":POKE 752,0:END
DDE 105 DATA 0,6,16,0,3,48,0,1,1,240,3,255,1,191,255,1,251
MDE 110 DATA 255,4,184,0,23,128,0,2,192,0,1,22,0,1,255,1,216,47
CDE 115 DATA 255,6,193,128,0,21,129,0,2,7,128,0,1,192,15,148,127,255,8
ROE 120 DATA 27,32,0,23,52,0,2,1,224,15,255,10,248,0,23,112,24,0,1
JOE 125 DATA 8,6,255,3,7,255,0,32,0,18,16,0,3,128,224,0,2,127
BEE 130 DATA 255,1,252,61,143,255,3,223,255,3,254,255,0,21,1,7,136,0,1
VME 135 DATA 7,255,2,254,29,199,255,3,227,255,4,223,192,0,16,16,0,3
BIE 140 DATA 12,62,32,0,1,31,255,3,131,227,255,3,227,255,3,252
VJE 145 DATA 0,6,16,0,13,48,248,6,11,255,4,227,225,255,3,224,120,67
GTE 150 DATA 255,4,128,0,19,67,224,48,15,255,4,240,241,255,3,241,248,199
TAE 155 DATA 4,240,0,2,1,64,0,14,1,15,128,128,127,255,4,240,56
IZE 160 DATA 255,3,223,240,135,255,4,254,0,5,1,0,6,2,0,4,16,4
VOE 165 DATA 63,131,3,255,6,8,127,255,2,177,225,143,255,5,192,0,1,2
AHE 170 DATA 128,0,3,64,0,11,255,1,136,15,252,255,4,239,255,3,254,248
WHE 175 DATA 225,15,255,5,240,0,2,128,0,14,3,250,64,31,223,127,255,5
DWE 180 DATA 143,191,255,1,254,195,31,255,6,0,12,32,0,4,7,253,192,255,1
XVE 185 DATA 3,255,4,247,239,255,3,127,248,63,255,6,160,0,1,248,0,13
XAE 190 DATA 1,31,219,3,255,1,240,31,255,2,251,255,1,247,2,7,127,254
PGE 195 DATA 63,255,7,237,0,1,16,0,12,8,0,1,127,254,15,255,2,131
VGE 200 DATA 255,1,254,255,1,248,255,4,188,254,255,7,241,0,1,4,0,14
JWE 205 DATA 254,228,31,255,2,224,23,255,1,254,127,255,5,125,255,7,252,128
ANE 210 DATA 16,0,13,3,253,176,63,255,3,31,63,159,255,6,251,248,255,3
CAE 215 DATA 241,255,3,0,1,12,0,13,39,248,65,255,5,253,255,8,231,255,3
YUE 220 DATA 193,255,3,128,11,0,10,32,0,2,79,244,195,255,4,231,255,12
DUE 225 DATA 254,15,255,3,224,1,0,13,31,241,135,255,4,252,127,255,9,223
BTE 230 DATA 255,1,240,63,255,3,242,0,14,63,207,15,255,3,252,255,2,207
GPE 235 DATA 255,9,191,193,255,4,248,0,14,127,254,31,255,4,207,255,1,225
JLE 240 DATA 255,10,231,255,4,252,32,128,0,9,4,0,2,255,1,204,63,255,3
VLE 245 DATA 223,191,255,1,240,127,255,1,253,255,6,252,127,255,5,2,96,0,11
EUE 250 DATA 1,255,1,252,127,255,3,254,255,2,252,31,255,1,251,239,255,5
XUE 255 DATA 249,255,6,128,32,0,11,1,255,1,248,127,255,6,254,7,255,2
NRE 260 DATA 221,155,255,11,196,96,0,11,11,255,1,240,248,255,2,253,247,255,3
ERE 265 DATA 129,255,2,249,196,255,5,207,255,5,224,48,0,11,15,255,1,113
FRE 270 DATA 255,0,224,255,3,237,246,207,255,9,223,255,4,207,227,247,231
AME 275 DATA 255,6,248,31,255,3,238,31,255,4,223,255,4,248,24,0,11,31
HWE 280 DATA 255,1,227,224,0,1,1,239,255,4,254,15,255,3,253,147,111,255,8
WE 285 DATA 253,64,0,7,32,0,3,31,253,231,207,255,1,127,223,255,5,131
XJE 290 DATA 255,4,248,111,255,4,252,7,255,2,254,4,0,11,63,255,1,227
TNE 295 DATA 192,127,255,1,191,255,5,0,1,255,9,240,0,1,15,255,3,16
YWE 300 DATA 11,63,255,1,199,252,0,1,247,129,255,4,252,0,1,63,255,7
XUE 305 DATA 254,0,2,255,4,144,0,11,63,253,207,255,1,248,7,125,255,4
OPE 310 DATA 252,0,1,15,255,7,0,2,15,255,4,128,0,11,127,255,1,207
TSE 315 DATA 255,2,239,255,6,128,3,255,6,0,2,96,31,255,1,240,255,2
BKE 320 DATA 136,0,11,127,255,1,239,255,3,99,255,5,240,1,255,5,128,0,1
PEE 325 DATA 127,255,1,254,0,2,127,255,1,196,0,9,1,0,1,127,255,1
BUE 330 DATA 223,255,9,254,0,1,127,255,3,192,0,1,255,4,15,252,63,255,1
HCE 335 DATA 226,0,11,127,255,1,239,255,10,224,31,255,2,240,0,1,127,255,3
YJE 340 DATA 7,0,2,31,255,1,224,0,11,63,255,1,127,255,2,254,183,255,6
ULE 345 DATA 252,0,1,31,224,0,1,63,255,5,131,255,3,224,0,11,127,254
SWE 350 DATA 127,255,11,0,3,31,255,5,253,255,4,241,0,11,63,255,4,254
VRE 355 DATA 247,255,7,0,2,7,255,6,129,255,4,243,0,11,127,255,1,127
YRE 360 DATA 255,2,254,87,255,7,0,2,127,255,11,241,0,11,63,255,13,0,2
HLE 365 DATA 127,255,11,240,0,11,31,255,1,127,255,2,239,251,255,7,128,0,1
TIE 370 DATA 15,255,6,192,255,4,240,0,11,31,255,1,63,255,1,192,7,3
VFE 375 DATA 255,7,224,0,1,195,255,11,248,0,11,31,255,2,192,0,1,247
GNE 380 DATA 255,0,254,7,248,63,255,10,248,128,0,10,31,255,1,223,199,240
DKE 385 DATA 3,255,11,135,255,5,238,255,4,248,0,11,15,255,1,223,224,0,1
HRE 390 DATA 123,192,255,10,240,255,5,224,255,4,249,128,0,10,15,255,1,231
EUE 395 DATA 224,254,1,223,255,10,254,31,255,4,239,199,255,3,249,0,7,32
SME 400 DATA 0,3,15,255,1,231,240,0,1,2,255,12,195,255,4,207,255,1
AHE 405 DATA 15,255,2,240,0,11,7,255,1,247,248,47,255,1,246,63,255,10
BVE 410 DATA 248,127,255,3,223,255,1,252,31,255,1,241,0,11,7,255,1,249
DZE 415 DATA 248,255,2,251,255,12,15,255,3,155,255,2,248,255,1,240,0,11
LNE 420 DATA 3,255,1,253,255,2,128,125,255,12,241,255,3,191,255,2,253,255,1
LUE 425 DATA 240,128,0,10,3,255,1,252,127,248,7,254,247,255,11,254,63,255,2
BFE 430 DATA 60,231,255,1,249,255,1,224,0,11,3,255,1,254,127,0,1,255,2
ALE 435 DATA 127,255,5,253,255,6,199,255,2,127,242,3,255,2,224,0,11,1
TIE 440 DATA 255,2,143,143,255,8,248,255,1,127,255,4,248,255,1,254,124,12
HRE 445 DATA 127,251,255,1,230,0,11,1,255,2,207,255,3,254,255,6,126,255,6
JKE 450 DATA 31,252,249,255,1,231,247,255,1,206,128,0,10,1,255,2,231,255,8
EFE 455 DATA 63,255,1,240,255,6,227,248,63,205,247,247,255,1,140,0,11,1
EKE 460 DATA 255,2,241,255,9,162,127,255,6,252,127,153,255,1,7,255,2,20
CSE 465 DATA 0,12,255,2,252,255,4,159,255,3,247,255,1,206,63,255,6,135
EME 470 DATA 191,231,255,1,239,255,1,12,0,12,255,2,254,95,255,9,254,253
NFE 475 DATA 255,6,128,255,2,143,223,254,142,15,128,0,10,127,255,2,143,255,2
LNE 480 DATA 193,254,31,255,5,231,255,6,128,31,255,2,159,252,240,0,12,255,3
FPE 485 DATA 263,255,2,6,128,255,12,253,255,1,231,255,3,253,252,0,12,127
IEE 490 DATA 255,2,243,255,1,248,24,31,252,255,11,247,255,1,252,255,3,243
NKE 495 DATA 248,0,12,127,255,2,253,255,1,224,224,255,13,223,255,2,159,255,2
LPE 500 DATA 231,248,0,12,127,255,3,62,7,135,255,2,243,255,10,207,248,255,4
KHE 505 DATA 207,224,0,12,127,255,1,247,255,1,239,156,31,241,254,239,255,9
SIE 510 DATA 251,247,224,63,255,3,63,192,0,12,127,255,1,207,255,1,247,192
BXE 515 DATA 126,7,255,2,231,255,10,135,15,255,2,254,63,0,13,127,255,1
MHE 520 DATA 129,255,1,252,121,239,15,255,2,191,255,9,124,112,195,255,2,249
WHE 525 DATA 255,1,1,224,0,11,63,255,1,128,127,255,1,62,126,31,255,3
JSE 530 DATA 191,255,6,191,255,1,242,28,48,255,1,254,224,200,0,13,63,255,1
ELE 535 DATA 128,31,255,1,3,252,63,255,2,254,127,63,255,4,207,255,1,127
UBE 540 DATA 225,135,12,31,255,1,130,128,0,13,127,255,1,0,1,7,255,1
SBE 545 DATA 252,224,127,255,3,252,127,254,127,159,227,255,1,231,255,1,248,112
VBE 550 DATA 193,31,254,5,224,0,13,127,255,1,0,2,255,1,252,29,255,3
KBE 555 DATA 127,252,255,3,243,243,255,2,254,12,40,63,184,118,224,0,13
CEE 560 DATA 192,255,1,0,2,31,255,1,195,255,3,254,31,255,1,248,125,253
DWE 565 DATA 131,255,4,195,132,254,224,125,128,0,13,127,254,0,2,3,255,1
EGE 570 DATA 249,255,3,252,63,63,255,0,240,231,255,1,3,178,0,14,127,254
ANE 575 DATA 3,255,2,63,255,2,252,126,63,255,3,254,255,4,252,31,252
SDE 580 DATA 2,180,0,14,127,252,0,3,15,255,1,247,255,2,248,124,63,255,3
JYE 585 DATA 254,127,255,5,224,31,248,0,14,127,252,0,4,248,1,254,127,255,1
ETE 590 DATA 248,248,63,255,3,254,31,255,5,128,238,160,0,14,127,248,0,4
WRE 595 DATA 31,255,1,231,255,1,240,254,63,255,3,254,15,255,4,248,1,219
HRE 600 DATA 128,0,14,255,1,240,0,4,3,255,1,254,127,225,222,63,255,4
BRE 605 DATA 199,255,4,128,0,1,43,0,15,255,1,240,0,5,63,255,1,243
RDE 610 DATA 252,62,63,255,4,225,255,3,248,0,1,1,248,0,15,255,1,224
STE 615 DATA 0,5,3,255,2,143,254,63,255,4,248,255,3,0,2,1,112,0,15
XLE 620 DATA 255,1,192,0,6,63,255,1,252,51,255,5,248,63,255,1,224,32
LGE 625 DATA 0,1,1,64,0,15,255,1,192,0,6,3,255,2,252,255,7,240
UTE 630 DATA 31,224,0,1,51,0,16,255,1,128,0,1,62,0,7,31,255,2,252,31,255,4
RBE 635 DATA 240,15,255,1,224,0,1,62,0,16,255,1,128,0,8,127,255,3
HIE 640 DATA 192,0,2,7,255,3,128,0,1,120,0,16,62,0,9,1,255,9
MOE 645 DATA 254,0,2,32,0,16,14,0,18,7,255,8,192,0,1,1,128,0,16
FAE 650 DATA 12,0,12,255,6,0,3,6,0,36,1,128,0,1,62,0,37,128
XVE 655 DATA 0,1,16,0,36,1,0,2,160,0,36,1,0,1,3,192,0,36
WYZ 660 DATA 2,0,1,2,0,37,2,0,1,14,0,12,1

```

MICROSCOPES COMPUTERS GEOLOGY PHOTOGRAPHY

A GENERAL SLOWDOWN in the computer business has resulted in some of the latest "state of the art" computer graphics hardware being released for resale at bargain prices. Some of these items were first introduced only a year ago. APPLICON'S, RAYTHEON'S, and HONEYWELL'S losses are your gain!



207. American Magnetics mag-stripe card readers. Reads and writes standard bank cards etc. Unused \$5.00.
209. Hewlett-Packard 7475 color plotter. Six-pen carousel controlled by software commands. Super fast 100 millisecond plot speed. Easy to program RS 232 interface uses BASIC or HPGL (Hewlett Packard Graphic Interface Language). Unused \$1300.

289. Pioneer Magnetics switching power supply with 750 watts 92-138 VAC, 47-63 Hz 5V @ 100A 15V @ 2A, 15V @ 4A, 24V @ 4A, all voltages adjustable +/- 20%; employs latest switching technology unusually light; good for running souped-up IBM PCAT computer. \$75.00.

387. Ikegami high resolution 13" color monitor. Usable at dot frequencies of over 30 MHz for superb resolution. Model CDB 143H made for Applicon, brand new in original cartons with separate Applicon housing. Operating information included \$300.

388. Fabulous Tektronix 4695 color screen copier. Tek's unique drop-on-demand ink-jet technology allows high resolution color display of your terminal to be printed at 1280 x 960 points per 8 1/2 x 11" page. Prints color transparencies also. Unused, in original boxes at 1/2 Tek's price. \$900.

391. Tektronix 4012 high resolution graphics terminal. Uses Tektronix storage tube technology. RS 232 interface, runs plot 10 software. Unused. \$595.00.

392. Panasonic 9", 12", and 15" monitors. Medium high resolution, typical 640 dot horizontal by 240 dot vertical or 25 lines by 80 characters. Green non-glare screen. Latest high frequency switching supply for 90-240 volt 60Hz operation. Brand new, original sealed cartons, recent manufacture \$59.00. Production quantities of Panasonic monitors available at reduced prices!

Write for our new FREE CATALOG. We buy, sell, and trade Science and Technology collectables! HiTec Antiques/F&W Sales, P.O. Box 509, 241 East Main Street, Westboro, MA 01581 Telephone orders call (617) 366-0918. We honor VISA and MASTERCARD.

Atari Help continued from page 161

CO12296, include the circuit inside the dotted lines. The circuit requires five connects to the PIA (U23). So, pines 12 through 16 must be bent up and connected to the circuit. The rest of the procedure is the same. Notice that this circuit has one more chip than the article's circuit. This is the price of compatibility.

"With the 256K dynamic RAMs in your XL, be sure to

wait at least ten seconds after turning the computer off. Otherwise it may not coldstart properly when you turn it back on. My original RAMdisk software doesn't work with this new mod. You may download [the new version] from the Capital Hill Atari Owners' Society BBS at 517-371-1106 or from the Castle Communications board at 517-371-4234. The source file is called QMEGXLD.SRC for Quarter-MEG XL Double. Also available is a RAMdisk program

that sets up one single-density RAMdisk and leaves the XE-equivalent banks free for XE software. This is quite useful with BASIC XE, DOS 2.5, or the new Synapse software. Its name is QMEGXLS.SRC.

"I ask one thing in return for this information: Please pass it around to all your interested friends. Put it in your club's library or on your favorite BBS. Encouraging software support of 256K will result in many interesting uses for it. Thank you and enjoy --

Claus Buchholz."

We owe a thousand thanks to Claus Buchholz and the C.H.A.O.S. users group of

Lansing, Michigan. Figure 1 shows the parts list, the memory control register, and the schematic diagram.

Other upgrades: Inspired by Claus Buchholz's article, David G. Byrd (1513 Commanche Drive, Las Vegas, NV 89109) has written a public domain article, "The Atari 800-Plus 256K," which gives 288K total memory for the Atari 800.

Tiny Tek (Rt. 1, Box 795, Quinlan, TX 75474) still offers its 48/52K upgrade for the Atari 400. "Sandy" Sandberg of Azure Electronics (1020 Price St. "E," Pismo Beach, CA 93449) writes of the Tiny Tek board "I have been installing these boards for customers

for several years. Please inform your readers of this memory replacement board which makes the 400 actually have a larger memory than the 800 (unexpanded) due to the hidden 4K at \$C000 to \$CFFF.

In response to Robert Harren's question on interfacing his Atari to a shortwave communications receiver (in the January 1986 "Atari Help") Bob Allman and Patrick Campbell wrote to recommend an article published in the November 1985 issue of *ANTIC*, "Morse Code Receiver by Steve Stuntz." Bob also suggests a look at the December 1985 issue of 73 for *Radio Amateurs*, which published another one-chip tone detector circuit for facsimile transmissions.

My thanks to all readers who wrote in to Help including R.J. Allman of M.A.S.H. (Millington, TN), Patrick Campbell (Birmingham, AL), Dan Garrett of Garrett Computing (Slidell, LA) Thomas Harker of ICD (Rockford, IL), John Kirkpatrick of Caledonia Enterprises (Sumter, SC), Dick Litchfield of STATUS (Virginia Beach, VA), S.D. Martin (Washington D.C.), Newell Industries (Wylie, TX), "Sandy" Sandberg (Pismo Beach, CA), and Jeffrey R. Wilson of SSI Software (Orem, UT).

Q. Thanks for a great column in *Computer Shopper*. I have several questions about the 800XL:

1) I cannot get the Microprose *Solo Flight* to load. The program will go as far as the title screen and freeze up. I've tried every combination of switch (down, up, same time) I can think of. That Atari Translator doesn't do anything either.

2) I have a Microperipheral Corp. modem. The problem is I cannot locate any software that will access this modem. The only software that works is the one that came with it that I typed in. I have tried Amodem, HomeTerm, etc. and they all give me a modem error.

3) Last question: Is the keypad program for 11/85 for the external keypad that connects to the joystick ports?

H. Wayne Shiver
Powder Springs, GA

A. We didn't have any trouble loading *Solo Flight* on our 800XL. You should only need to hold down the OPTION key while you turn on your computer (with the diskette in the disk drive). The translator disk is not needed. If you continue to have problems, it could be your diskette. Contact MicroProse for a replacement (10616 Beaver Dam Road, Hunt Val-

Chip Specials

DYNAMIC RAMS

256K	120ns	3.05
256K	150ns	2.50
64K	150ns	1.10

STATIC RAMS

6264LP-15	150ns	2.95
6116LP-3	150ns	1.85

EPROMS

2764	200ns	3.25
2764	250ns	2.50
27128	250ns	2.75
27256	250ns	4.75

MATH COPROCESSORS

8087-2	125.00
8087-3	110.00



MicroTech

P.O. Box 75673

Seattle, WA 98125

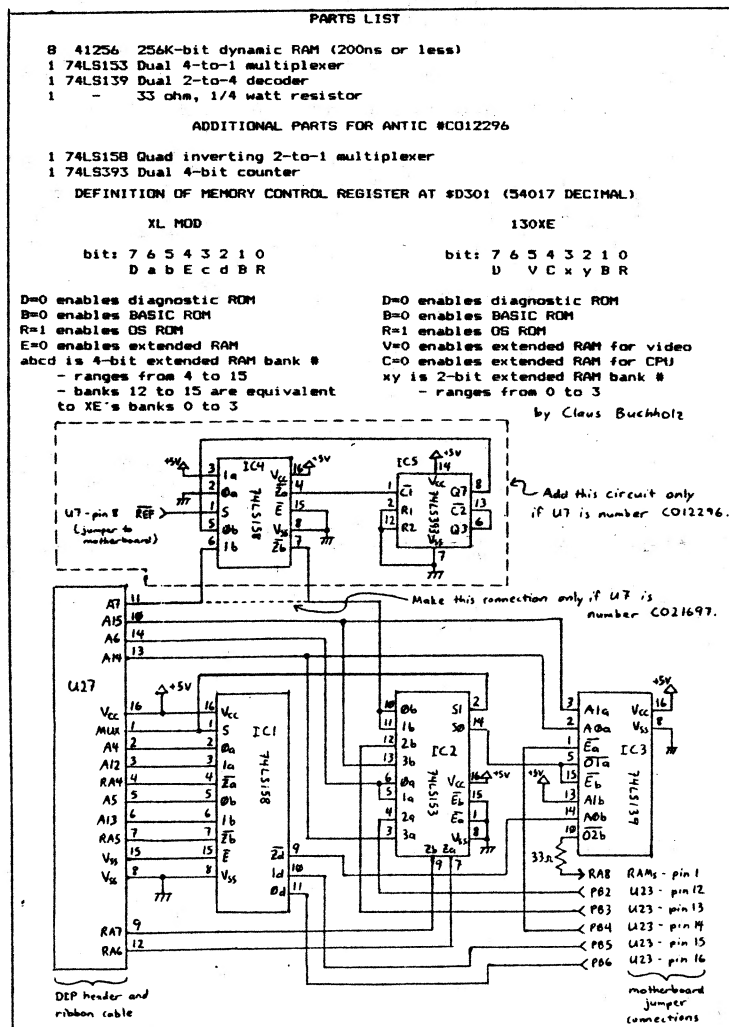


(206) 364-2209 8-6 Mon-Sat

\$4 S&H • Wash. residents add 7.9% sales tax

Prices subject to change.

All merchandise is 100% guaranteed.



Atari Help continued from page 164

ley, MD 21030, 301-667-1151).

Regarding your question about software for the MPP modem series, several programs that support this modem are in the public domain. These include *MSCOPE MPP*, which lets you download from CompuServe, *VT100 Terminal Emulator*, which features an 80-column, DEC-compatible

display, and *HomePak Customizer Disk* which includes a special handler for the MPP modem. Your local users group may have these programs available, or a friend can download them for you from an Atari BBS. *ANTIC* (524 Second St., San Francisco, CA 94107) also offers these on diskette for \$10.00 per program.

November's Keypad pro-

gram is indeed for the Atari CX85 keypad that plugs into the joystick ports. I have more information on this keypad planned for future months.

Q. The joystick ports on the XL are able to supply a +5vdc switched output to an external device. I remember reading this at some time, but do not remember the details; and whatever the publication, it is now long gone. Would you

know how to control this output?

A. David Alan Hayes' article, "Control Your Environment with the Atari 400/800," (*BYTE*, July 1983) is exactly what you are looking for, and I have recommended this well-written article in the past. You can probably find it in your local library. David discusses using the four joystick ports on the Atari 400 or 800, but what is said also applies to the two

joystick ports on the XL/XE units. (Incidentally, the XL and XE machines use the other two ports internally to control the switching in and out of RAM and ROM, and to specify the memory banks on the 130XE.)

Address Atari-related questions to:

Jeff Brenner "Atari Help"
c/o Computer Shopper
P.O. Box F
Titusville, FL 32781-9990

NOW AT THE SBC MART COMPUTING SALE-A-THON

OUR BIGGEST SALE EVENT EVER!

HARD DISK KITS

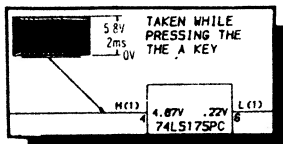


- complete 10MB Kit
- only \$410

- Complete internal 1/2-hi 10MB kit, only \$410.
- Same kit with low-power 3-1/2" drive, \$485.
- 3-1/2" 10MB Winchester drive alone, now \$385.

COMPUTERFACTS

- schematics
- waveforms
- troubleshooting techniques



Buy now and get **INTRODUCTORY PRICES**. Complete systems \$39 each: Apple IIc, IBM PC, TRS-80 II.

Components \$19 each: Apple II/II-Plus, IIe; Epson MX-80/TF, MX-100, FX-80, FX-100.

Over 40 more. Write for list.

SPECIAL BONUS Norton Utilities Ver 3.0 Reg \$90, only \$60 w/purchase of any disk drive.
IBM PC-DOS 3.1 (the real thing) Reg \$65, only \$50 w/purchase of motherboard.

CASES

- IBM style, 5 or 8 slot
Reg \$95, Sale \$89.

KEYBOARDS

- 5150 style Reg \$125,
on sale for only \$90.

MOTHERBOARDS



These are excellent foundations for complete business, personal, and workbench/integration PCs.

- MB-1 256K motherboard, 8 exp slots, w/OK Reg \$295, now \$220; 256K Sale \$260.
- MB-3 640K motherboard, 8 exp slots, w/OK Reg \$399 now \$250; 640K Sale \$325.
- MB-2 640K motherboard, 4.77 and 7.6MHz clock 8 exp slots, w/256K Reg \$449, now \$369.

OUR PLEDGE

- technical support
- one-year warranty
- service after sale
- and low prices

LAST MINUTE ITEMS

NEC V20 CPU:
increase the speed
of your 8088 system
50 to 90% **\$22**

RAM, 9-chip sets:
ID-256 256K **\$32/set**

DRIVES super quality:
F-4 48tpi DSDD **\$99**

5151 STYLE KEYBOARD:
KB-4 keyboard **\$119**

135W POWER SUPPLY:
PS-135 side sw **\$90**

SUPER SOFTWARE SPECIALS

- Microsoft Macro assembler **BEST PRICE \$107**, BASIC interp Reg \$340, Sale \$280.
- Ellis/Utah COBOL or PASCAL compilers, or BASIC interpreter, only \$39 each.
- Open Systems Business BASIC interpreter, Reg \$180, Sale \$155.
- True Lattice C compiler Reg \$475, Sale \$349.



Complete system on sale under \$1,000.

ADD-ON-CARDS SPECIALS

- HDC-1 OMTI hard disk controller, up to 2 drives, with cables, super fast controller.....**\$175**
- MGC-2 hi-res TTL monochrome card Reg \$130, only \$95; CL-1 clk/cal w/battery, Reg \$59 now.....**\$56**
- I/O-1 floppy disk controller, clock/cal, serial, parallel, and game ports, more.....**\$145**
- MFC-4 multifunction 384K RAM, clock/calendar, serial, parallel, w/OK \$145, w/384K.....**\$170**
- SYS-3 COMPLETE SYSTEM: 256K RAM, keyboard, FDC-2, 2 F-4s, mono or color card.....**\$999**

Shipping and handling: drives/motherboards/cases/power supplies \$4.50 ea, cards \$3 ea, software \$2.50 ea, modems/keyboards \$4 ea, COMPUTERFACTS \$3 ea, memory/diskettes \$1/set/box. CA residents add 6% sales tax.

The SBC Mart

To order or for further information:
CALL (619) 375-5744

The SBC MART, P.O. Box 1296, Ridgecrest, CA 93555

The SBC MART is part of Computing Technology, 821-B Commercial Street, Ridgecrest, CA 93555

Applying Atari Programs continued from page 162

PIXNIX PUZZLE MACHINE

```

VJJ 10 REM PIXNIX PUZZLE MACHINE
KJG 20 REM COPYRIGHT 1986 JEFF BRENNER
ENJ 30 DIM P$(176),C$(48),C2$(48),TEMP$(25),FILE$(25),A$(10),B$(10)
MKJ 40 OPEN #1,4,0,"K":GOSUB 160
TCJ 50 C1$=P$(176):C1$(17)=CHR$(255):C1$(32)=CHR$(255)
MAJ 60 C1$(18,31)=C1$(17,32):C1$(LEN(C1$)+1)=P$
YAJ 70 DIM GT$(57),PT$(53),SCR$(7680),MOVE$(56),CHP$(65),SWAP$(62),CIO$(7)
IUJ 80 GOSUB 930:DIM P$(320):HOLD$(320):P$(320)=CHR$(0)
KKJ 90 POKE 106,PEEK(106)-16:GRAPHICS 24:GOSUB 720:J=PEEK(88)+256:PEEK(89)
NXJ 100 RESTORE 110:FOR I=1664 TO 1684:READ N:POKE I,N:NEXT I:A=USR(1664)
PIJ 110 DATA 104,162,6,160,138,169,7,76,92,228,165
YVJ 120 DATA 20,41,247,141,192,2,76,98,228
BRJ 130 PH=PEEK(166):POKE 54279,PH:POKE 53277,3:POKE 53248,0
FSJ 140 V=PEEK(134)+256:PEEK(135)=A:PEEK(140)+256:PEEK(141)=OS=PH*256+512-A
NDJ 150 H=INT(OS/256):L=OS-H*256:POKE V+2,L:POKE V+3,H:GOSUB 160:GOTO 170
SGJ 160 PH$(1)=CHR$(0):PH$(176)=CHR$(0):PH$(2)=PH$:RETURN
YMJ 170 X=48:Y=48:PH$(Y-47,Y+48)=C1$:POKE 53256,3
UAJ 180 DIM JX(10),JY(10)
FAJ 190 RESTORE 200:FOR I=0 TO 9:READ X1,Y1:JX(I)=X1:JY(I)=Y1:NEXT I
FUJ 200 DATA 32,16,32,-16,32,0,0,0,-32,16,-32,-16,-32,0,0,0,16,0,-16,0,0
NDJ 210 GRAPHICS 8+32:GOSUB 720
PNJ 220 TEMP$="" :CLOSE #3:PRINT "CASSETTE OR DISKETTE (C/D)? ";
DJJ 230 GET #1,D:PRINT CHR$(D):IF D<67 OR D>68 THEN 220
PNJ 240 IF D=68 THEN PRINT "LOAD WHAT PICTURE FILE? D:":INPUT #16:TEMP$
EHJ 250 IF LEN(TEMP$) OR D>68 THEN 340
PUJ 260 TRAP 330:PRINT "DIRECTORY (PRESS RETURN OR Y)":OPEN #2,6,0,"D:*.":
NRJ 270 INPUT #2:FILE$:IF FILE$(2,2)<>CHR$(32) THEN 330
VJJ 280 A$=FILE$(1,10):PRINT A$:"":FILE$(11,13)="?":CHR$(32);
BCJ 290 GET #1,N:PRINT CHR$(N):IF N<89 THEN 270
CCJ 300 IF A$(LEN(A$))=CHR$(32) THEN A$=A$(1,LEN(A$)-1):GOTO 300
ETJ 310 TEMP$=A$(3):TEMP$(LEN(TEMP$)+1)="":TEMP$(LEN(TEMP$)+1)=FILE$(11)
WDJ 320 CLOSE #2:GOTO 340
QOJ 330 TRAP 40000:PRINT :CLOSE #2:GOTO 240
EOJ 340 FILE$=CHR$(D):FILE$(2,2)="":FILE$(LEN(FILE$)+1)=TEMP$
ODJ 350 POKE 881,0:TRAP 220:OPEN #3,4,0,FILE$
WQJ 360 H=INT(ADR(SCR$)/256):L=ADR(SCR$)-H*256:POKE 884,L:POKE 885,H
ASJ 370 POKE 888,0:POKE 889,30:POKE 882,7:A=USR(ADR(CIO$),48):CLOSE #3
XCJ 380 TRAP 40000:A=USR(ADR(MOVE$),ADR(SCR$))
ADJ 390 GRAPHICS 8+16+32:GOSUB 720:POKE 53248,48
KHJ 400 POKE 18,0:POKE 19,0:POKE 20,0:TF=0
HOJ 410 I=0:D=STICK(0)-5:IF D=10 THEN 540
PRJ 420 SOUND 3,0,1,6:SOUND 3,0,1,0:POKE 77,0
YZJ 430 X=X+JX(D):Y=Y+JY(D):IF X<48 THEN X=176
ABJ 440 IF X>176 THEN X=48
YAJ 450 IF Y<48 THEN Y=128:GOSUB 160
YDJ 460 IF Y>128 THEN Y=48:GOSUB 160
YXJ 470 IF HOLD$="" THEN FOR DL=1 TO 14:NEXT DL
KRJ 480 POKE 53248,X
VPJ 490 PH$(Y-47,Y+48)=C1$
MSJ 500 IF LEN(HOLD$)=0 THEN 540
ONJ 510 A=USR(ADR(PT$),ADR(P$),S)
OIJ 520 S=J+(X-48)/4+(Y-48)*80:A=USR(ADR(GT$),ADR(P$),S)
YVJ 530 A=USR(ADR(PT$),ADR(HOLD$),S)
IEJ 540 SOUND 0,0,0,0:IF PEEK(764)=33 THEN GOSUB 730
QJJ 550 FL=0:IF PEEK(53279)=3 THEN GOSUB 660
ENJ 560 IF PEEK(53279)=6 THEN GOSUB 760
EHJ 570 IF STRIG(0) THEN 410
LYJ 580 SOUND 0,0,0,6
S9J 590 S=J+(X-48)/4+(Y-48)*80:IF HOLD$="" THEN 620
KJJ 600 HOLD$="" :IF S<OS THEN S=OS:A=USR(ADR(PT$),ADR(P$),S)
BOJ 610 GOTO 640
FFJ 620 OS=S:A=USR(ADR(GT$),ADR(P$),S)
CFJ 630 HOLD$=P$:P$=CHR$(0):P$(320)=CHR$(0):P$(2)=P$
IFJ 640 IF STRIG(0)=0 THEN 640
BWJ 650 GOTO 400
DAJ 660 XX=INT(RND(0)*5):YY=INT(RND(0)*6):S=J+XX*8+YY*1280
FGJ 670 IF FL=0 THEN FL=1:A=USR(ADR(GT$),ADR(P$),S):S1=S:HOLD$=P$:GOTO 660
RMJ 680 A=USR(ADR(GT$),ADR(P$),S):A=USR(ADR(PT$),ADR(P$),S1):S1=S
NNJ 690 IF PEEK(53279)=3 THEN 660
DFJ 700 IF TF=0 THEN TF=1:POKE 18,0:POKE 19,0:POKE 20,0:SOUND 0,11,12,10
RIJ 710 A=USR(ADR(PT$),ADR(HOLD$),S1):HOLD$="" :RETURN
MFJ 720 POKE 559,46:POKE 710,0:POKE 16,64:POKE 53774,64:POKE 764,255:RETURN
XKJ 730 A=USR(ADR(SWAP$),ADR(SCR$))
RGJ 740 IF PEEK(53775)=251 THEN 740
UEJ 750 POKE 764,255:A=USR(ADR(SWAP$),ADR(SCR$)):RETURN
XSJ 760 A=USR(ADR(CHP$),ADR(SCR$)):IF PEEK(208)=0 THEN 780
SFJ 770 SOUND 0,45,6,8:FOR I=1 TO 100:NEXT I:SOUND 0,0,0,0:RETURN
NKJ 780 TH=(PEEK(20)+256:PEEK(19)+256:PEEK(18))/60-0.21:RESTORE 820
JDJ 790 FOR I=0 TO 3:READ N:FOR V=12 TO 0 STEP -1:SOUND I,N,10,V:NEXT V
LVJ 800 NEXT I:FOR I=53761 TO 53767 STEP 2
ASJ 810 POKE I,166:NEXT I:FOR I=1 TO 90:POKE 712,I:NEXT I
XFJ 820 DATA 243,193,162,121
EWJ 830 SOUND 1,29,10,8:SOUND 3,11,10,8:POKE 710,12:FOR I=1 TO 100:NEXT I
KBJ 840 POKE 710,0:POKE 712,0:FOR I=0 TO 3:SOUND I,0,0,0:NEXT I
ANJ 850 GRAPHICS 8+32:GOSUB 720:PRINT CHR$(125):TIME:POKE 559,46
LHJ 860 M=INT(TM/60):S=TM-M*60
HRJ 870 PRINT M;" MINUTES AND ";INT((S*100+0.5)/100);" SECONDS."
TFJ 880 PRINT "SCORE: ";INT((1000-TM)*1000+0.5)
XZJ 890 PRINT "SAME OR NEW PUZZLE (S/N)? ":GET #1,N:PRINT CHR$(N)
SKJ 900 IF N<83 AND N<78 THEN 890
SSJ 910 IF N=78 THEN 220
TUJ 920 A=USR(ADR(MOVE$),ADR(SCR$)):GOTO 390
RLJ 930 POKE 559,0:RESTORE 940:FOR I=1 TO 57:READ N:GT$(I,1)=CHR$(N):NEXT I
KKJ 940 DATA 104,104,133,205,104,133,204,104,133,204,104,133,206,162,32,160
DCJ 950 DATA 7,177,206,145,204,169,0,145,206,136,16,245,24,165,206,105
EEJ 960 DATA 40,133,206,165,207,105,0,133,207,165,204,105,0,133,204,165
FEJ 970 DATA 205,105,0,133,205,202,208,215,96
NCJ 980 GOSUB 1210:FOR I=1 TO 53:READ N:PT$(I,1)=CHR$(N):NEXT I
LCJ 990 DATA 104,104,133,205,104,133,204,104,133,207,104,133,207,162,32,160
GIJ 1000 DATA 7,177,204,145,206,136,16,249,24,165,206,105,40,133,206,165

```

programs continued on page 167

Free Software continued from page 66

Megariods is an ST version of the arcade classic Asteroids, that runs in both high and medium res. It was written by Mike and Mitch Bunnell of Megamax Inc. As a demonstration program for their Megamax C compiler. This is an excellent rendition of the arcade game. With outstanding 3-D astroids and good sound effects. Its not as good as the arcade version of the game it's better.

You can get Megariods from the same places that you get either ST Writer or NEOchrome. But you can't get the source code for ST Writer or NEOchrome anywhere (unless you have unscrupulous friends at Atari). You can however get the C source code for Megariods (hard copy listing only) by sending \$25 to Megamax at the address below. If properly commented it should prove invaluable as a learning aid in mastering C on the ST.

Megamax Inc.

P.O. Box 851521

Richardson, TX 75085-1521
ATT: ST Megariods Source
(214) 987-4931

The Megamax C compiler can also be ordered from the same address for \$199.95. The advertising copy for the compiler sounds impressive. Full K&R plus common extensions. It features full floating point, one pass compilation optimized for 68000, smart linker, librarian, dynamic overlays, creates stand alone ST applications, in-line assembly language, batch facilities, and no license fees. However, until we see the compiler ourselves, we can't say if it is as good as it sounds. But one thing for user it was capable of creating one great program in Megariods.

The public domain library for the ST contains many more than just these three programs. To get the most out of your investment in a 520ST it would behoove you to be aware of the excellent software available free for the asking. The best way to do this is to join a users group. The local ST UG already has nine disks full of public domain stuff, with more programs being added every week. Some other groups have much larger collections.

No you won't find a free program to fill your every need. But it will surprise you to know just how many good programs there are. And communicating with other users is one of the best ways to get an unbiased opinion of any commercial packages you are interested in. As always the Computer Shopper will try to keep you up to date. But the more sources of information you have the better off you will be.

Applying Atari Programs continued from page 166

```

DGJ 1010 DATA 207,105,0,133,207,165,204,105,8,133,204,165,205,105,0,133
FRJ 1020 DATA 205,202,208,219,96
TLJ 1030 FOR I=1 TO 56:READ N:MOVE(I,I)=CHR$(N):NEXT I
LYJ 1040 DATA 104,104,133,205,104,133,204,165,88,133,206,165,89,133,207,162
ILJ 1050 DATA 192,160,39,177,204,145,206,136,16,249,24,165,204,105,40,133
HMJ 1060 DATA 204,165,205,105,0,133,205,24,165,206,105,40,133,206,165,207
YKJ 1070 DATA 105,0,133,207,202,208,218,96
OHJ 1080 FOR I=1 TO 65:READ N:CHR$(I,I)=CHR$(N):NEXT I
JYJ 1090 DATA 104,104,133,205,104,133,204,169,0,133,208,165,88,133,206,165
LXJ 1100 DATA 89,133,207,162,192,160,39,177,204,209,206,208,33,136,16,247
FHJ 1110 DATA 24,165,204,105,40,133,204,165,205,105,0,133,205,24,165,206
NMJ 1120 DATA 105,40,133,206,165,207,105,0,133,207,202,208,216,96,230,208,96
TNJ 1130 FOR I=1 TO 62:READ N:SWAP(I,I)=CHR$(N):NEXT I
LZJ 1140 DATA 104,104,133,205,104,133,204,165,88,133,206,165,89,133,207,162
KOJ 1150 DATA 192,160,39,177,204,72,177,206,145,204,104,145,206,136,16,243
FMJ 1160 DATA 24,165,204,105,40,133,204,165,205,105,0,133,205,24,165,206
RNJ 1170 DATA 105,40,133,206,165,207,105,0,133,207,202,208,212,96
ODJ 1180 FOR I=1 TO 7:READ N:CIO$(I,I)=CHR$(N):NEXT I
TDJ 1190 DATA 104,104,104,170,76,86,228
CPJ 1200 RETURN
NFJ 1210 A$="PIXMIX":DIM X(6),Y(6),C(2):GRAPHICS 2:POKE 710,0:N=0
QOJ 1220 POKE 708,66:POKE 709,216:POKE 711,148
FAJ 1230 C(0)=0:C(1)=32:C(2)=160
GfJ 1240 FOR I=1 TO 6:X(I)=5+INT(RND(0)*10):Y(I)=INT(RND(0)*10)
RRJ 1250 POSITION X(I),Y(I):PRINT #6:CHR$(ASC(A$(I,I))+C(N)):N=N+1
TSJ 1260 IF N=3 THEN N=0
ASJ 1270 NEXT I
VKJ 1280 B=1:FOR I=1 TO 6
GWJ 1290 X=X(I):Y=Y(I)
USJ 1300 SOUND 1,X(I)*4,10,B:SOUND 2,Y(I)*4,10,B
CIJ 1310 IF Y(I)>5 THEN Y(I)=Y(I)-1:B=0
CIJ 1320 IF Y(I)<5 THEN Y(I)=Y(I)+1:B=0
GUJ 1330 IF X(I)>1+6 THEN X(I)=X(I)-1:B=0
GUJ 1340 IF X(I)<1+6 THEN X(I)=X(I)+1:B=0
AWJ 1350 POSITION X,Y:PRINT #6:CHR$(32):POSITION X(I),Y(I):PRINT #6:A$(I,I)
NFJ 1360 POSITION X(I),Y(I):A=ASC(A$(I,I)):PRINT #6:CHR$(A+C(N))
IXJ 1370 N=N+1:IF N>2 THEN N=0
NKJ 1380 NEXT I:IF B=0 THEN 1280
TQJ 1390 POKE 752,1:POKE 657,13:PRINT "PUZZLE MACHINE"
XHJ 1400 POKE 657,7:PRINT "Copyright 1986 Jeff Brenner":POKE 53768,1
DEJ 1410 FOR I=1 TO 36
WNJ 1420 N=PEEK(711):POKE 711,PEEK(709):POKE 709,PEEK(708):POKE 708,N
VZJ 1430 NEXT I:PRINT "POKE 657,15:PRINT "STAND BY...":
TIJ 1440 SOUND 1,0,0,0:SOUND 2,0,0,0
DFZ 1450 POKE 752,0:RETURN

```

Call for Latest Prices! 20 MEG TAPE BACKUP... \$579.
SPECIAL!!!
10 MEG 1/2 HT \$229.
HARD DRIVE
20 MEG 1/2 HT...\$335.

**HARD DRIVE SYSTEMS WITH
PC CONTROLLERS & CABLES**
Internal Systems
(add \$125. for External)
Miniscribe & Other Fine Brands!!!
10 MEG 1/2 Hgt. \$355.
20 MEG 1/2 Hgt. \$459.
6 MONTH WARRANTY HARD DRIVES

FLOPPY DRIVES
TEAC DS, DD \$95. DS, QD \$99.
MITSUBISHI: DS, QD \$89.
EPSON (low power usage) DS,DD \$89.
1 YR. WARRANTY ON FLOPPY DRIVES

XT-CLONE MOTHER BOARD
Fully 90 DAY WARRANTY 1YR. WARRANTY
Socketed \$135. \$149.
MEMO-576 A very nice 5 1/2 in. card
which will hold up to 3 rows of chips and
up to 2 of these may be 256K chips for
a total of 576K \$65.

Dealer & OEM Discounts Available

**Call for
Prices on
Other Boards
& Complete
Systems**



M.C. & VISA Accepted
OWL-Services
P.O. Box 116
Mertztown, PA
19539
PA Res Include 6% Tax
PA (215) 682-6855

TOLL FREE ORDER LINE (800) 245-6228

SILVERWOLF
SOFTWARE
SILVERWOLF
SOFTWARE
SILVERWOLF
SOFTWARE

EXTENDER CABLE \$ for between PEB cable & Console 21.95
LEGEND 808 PRINTERS With Cable 91.75
MYARC RAM DISK \$ 128K-\$204.95 -- 512K-\$335.95 \$
POWER PAK for MYARC RAM DISKS \$ 14.95 & 35.95 W/Bat. & Chgr.

SILVER WOLF SOFTWARE

P.O. Box 1544

Rohnert Park, Ca. 94928-1126
[707] 528-7866

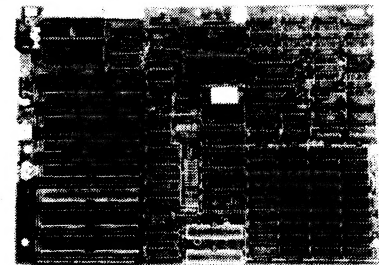
\$3.50 S&H... (Orders over \$300 Shipped Free). Ca. Residents
Add 6% Tax. Send us this ad to receive our free catalog.

**Go for the Best,
Regardless of Cost
EVEN IF IT'S CHEAPER**

XPCTURBO

**Dual
processor
speed
4.77 MHz
and
7.00 MHz**

\$295⁰⁰



**The
most
advanced
Mother
Board
available!**

- 640K (64K-640K select-able) RAM on-board with parity check
- Hi-speed (6.67MHz!) 8088-2 CPU micro-processor with 8087 math co-processor optional
- 8K TURBO BIOS
- Full 640K RAM (maximum XT memory map RAM address) capacity
- IBM PC pinpoint compatible power connector
- 8 channel interrupt 8259
- 8 I/O slot XT standard
- 4 layer printed circuit board
- 2 rows of 256K RAM chips
- 2 rows of 64K RAM chips
- Same dimensions as the IBM XT motherboard
- Full IBM XT compatibility
- 4 channel DMA 8237-5

System Components

XPCTURBO Motherboard **\$195⁰⁰**
Features a clean 2-layer design allowing high production yield at a low cost with all add-on RAM fully socketed, as well as sockets for all major IC's. BOA-6058-00

135W \$89⁰⁰ Add-On Power 150W \$115⁰⁰
IBM Hard Disk replacement types, 135/150 Watt, New High Velocity Whisper Fan, will easily run 2 Floppies, Hard Disk and Tape Back-up. 135W POW-1040-00 150W POW-1044-00

Stdndr \$59⁰⁰ IBM Style Kybrds Selectric \$99⁰⁰
These quiet alternative Selectric type keyboards will bring the features you have been wanting to a price you can't resist. Stdndr KEY-1050-00 Selectric KEY-1051-00

8 Slot Cabinets **\$75⁰⁰**
Grey/Beige, enamel finish, perfect fit for IBM PC or XT compatibles, all mtg. hardware 8 Slot CAB-3068-00

PROM Laser by XOR **\$129⁰⁰**
Hi-speed algorithms will burn 2716, 2732, 2732A, 2764 (in 52 sec), 27128, 27256 EPROMs under software control right in your PC BOA-8640-00

Super 12 PAK Multifunction **\$110⁰⁰**
Features Parallel Port, Serial Port, Game Port, Clock/Calendar, Expand to 384K, all cables, PrintSpooler and RAM Disk Software BOA-6335-00

7 PAK Multifunction **\$165⁰⁰**
Features Floppy Controller, Parallel Port, Serial Port (optional 2nd Serial), Game Port, Clock/Calendar, RAMdisk, PrintSpooler, all cables & manuals BOA-6250-00

Color Graphics Adaptor **\$95⁰⁰**
Supports two levels of graphics and text in monochrome or color. Low resolution 320 x 200 pixel, high resolution 640 x 200 pixel BOA-6200-00

Hard Disk Controller **\$135⁰⁰**
Handles 1 or 2 drives, 5 to 140 megabytes with minimum software configuration. Features DOS 2.1 & 3.1 compatibility, and ST-506 Interface BOA-8060-00

Hi-Resolution Mono Graphics **\$99⁰⁰**
This Hercules type board will run 1-2-3 software with a true full screen, high resolution of 720h x 348v pixels BOA-6150-00

Floppy Disk Controller **\$59⁰⁰**
Runs from 1 to 4 Floppy Disk Drives, 48 TPI, SS/DD or DS/DD. Includes floppy controller cable, completely tested & ONE YEAR Warranty. BOA-6100-00

Real Time Clock/Calendar **\$35⁰⁰**
The optimum Clock/Calendar for your PC. Battery back-up to keep your disk log up-to-date every time you "boot-up". Software included. BOA-6375-00

2 Serial \$42⁰⁰ Short board Serial RS-232C port with optional Second port. BOA-6300-00
1 Parallel \$27⁰⁰ Short board Centronics Parallel port interface card w/manual for your PC BOA-6310-00

Micro Products International
714/898-0840
Fax: 714/897-3363
Telex: 887841 XORDATA HTBH
15392 Assembly Lane, Unit A • Huntington Beach, CA 92649